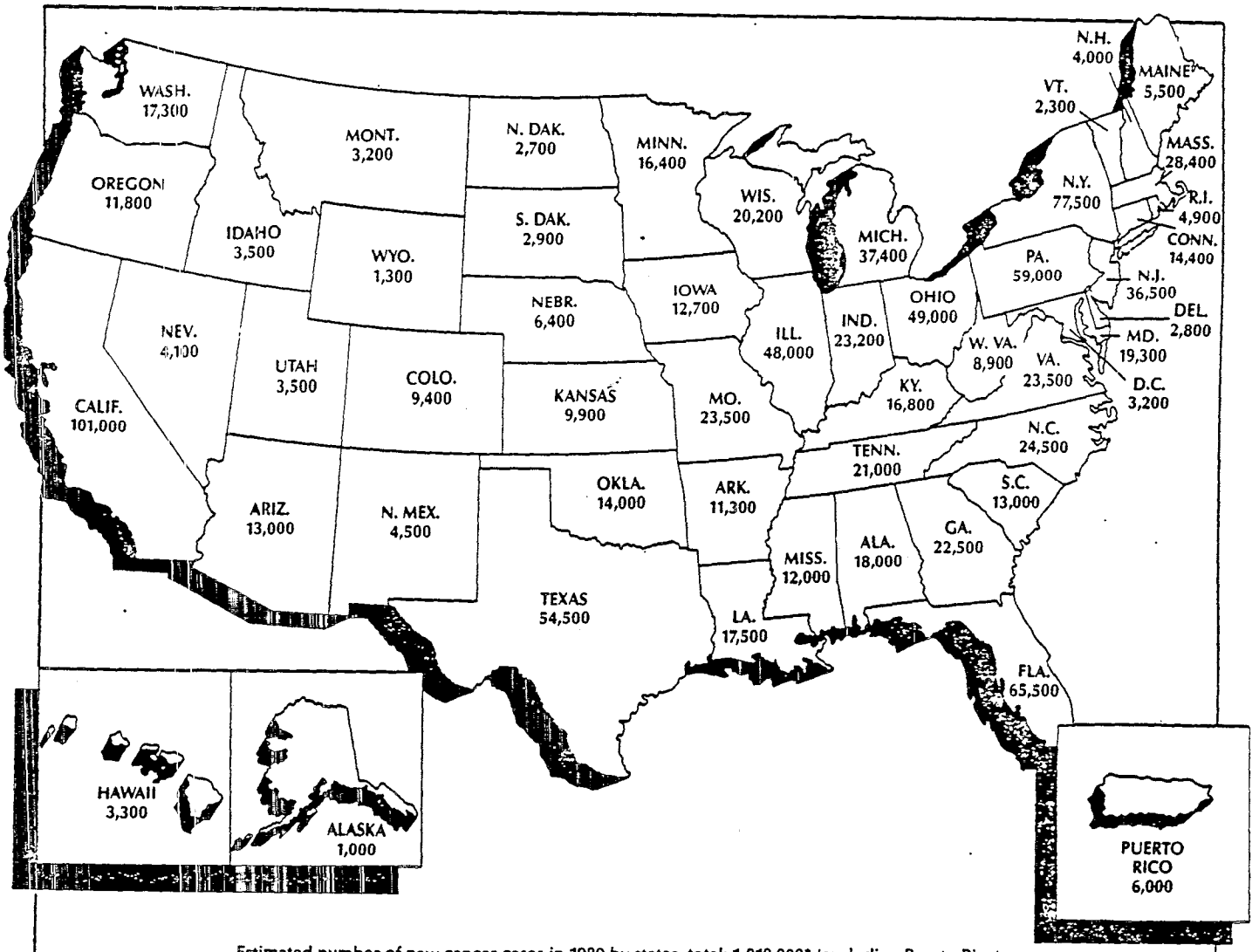
AMERICAN CANCER SOCIETY®

CANCER FACTS & FIGURES-1989



Estimated number of new cancer cases in 1989 by states, total: 1,010,000* (excluding Puerto Rico).

*Excluding non-melanoma skin cancer and carcinoma in situ.
BASED ON RATES FROM NCI SEER PROGRAM (1983-1985).

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CONTENTS

*Table/Chart

SOURCES OF STATISTICS

Incidence

Since there is no national office which records every new cancer case, there is no way of knowing exactly how many new cases of cancer are diagnosed each year. In the past, estimates of cancer incidence were made by extrapolating from the experience of the few population-based cancer registries.

Estimates of incidence in *Facts & Figures* editions prior to 1974 were based on data from two state cancer registries. The issues from 1974 through 1978 used information from the National Cancer Institute's Third National Cancer Survey (1969-1971) of nine major areas of the United States.

Then in 1973, NCI began a new and larger program, gathering data from 11 population-based registries. It is called SEER, standing for Surveillance, Epidemiology and End Results. Beginning with the 1979 edition of *Facts & Figures*, SEER incidence information has been used. Each time a new data base is introduced, there may be some sharp changes in figures, due to the more accurate data. The changes do NOT indicate either a cancer epidemic or miracle cure.

For valid comparisons between years, incidence statistics from the 1974 through 1978 editions of *Facts & Figures* may be compared with one another, while those from the 1979 to 1984 editions may be compared.

The latest available information for this 1989 edition is SEER data from the years 1983-1985.

Mortality

The source for mortality statistics has remained constant over the years: the National Center for Health Statistics, Department of Health and Human Services.

The 1989 figures are estimates based on the latest available information, which includes mortality data through 1985.

Beginning with the 1981 edition of *Facts & Figures*, mortality rates per 100,000 population were age-adjusted to the 1970 census population, rather than the 1940 census population. Comparing these charts and figures with those of previous years may indicate false trends.

Survival

Because of the 5-year waiting period, survival statistics take longer to compile. In this edition, we show the latest survival rates for cases diagnosed in the period 1979-84 in the SEER program.

CANCER: BASIC DATA

BASIC DATA

What is cancer?

Cancer is a large group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled or checked, it results in death. However, many cancers can be cured if detected and treated promptly.

How is cancer treated?

By surgery, radiation, radioactive substances, chemicals, hormones and immunotherapy.

Who gets cancer?

Cancer strikes at any age. It kills more children 3 to 14 than any other disease. And cancer strikes more frequently with advancing age. In the 1980's, there were estimated over 4.5 million cancer deaths, almost 9 million new cancer cases, and some 15 million people under medical care for cancer.

How many people alive today will get cancer?

About 76 million Americans now living will eventually have cancer; about 30%, according to present rates. Over the years, cancer will strike in approximately three out of four families.

How many people alive today have ever had cancer?

There are over 5 million Americans alive today who have a history of cancer, 3 million of them with diagnosis five or more years ago. Most of these 3 million can be considered cured, while others still have evidence of cancer. By "cured" is meant that a patient has no evidence of disease and has the same life expectancy as a person who never had cancer.

The decision as to when a patient may be considered cured is one that must be made by the physician after examining the individual patient. For most forms of cancer, five years without symptoms following treatment is the accepted time. However, some patients can be considered cured after one year, others after three years, whereas some have to be followed much longer than five years.

How many new cases will there be this year?

In 1989 about 1,010,000 people will be diagnosed as having cancer.*

How many people are surviving cancer?

In the early 1900's few cancer patients had any hope of long-term survival. In the 1930's less than one in five was alive at least five years after treatment. In the 1940's it was one in four, and in the 1960's it was one in three.

Today, about 405,000 Americans, or 4 out of 10 patients who get cancer this year, will be alive 5 years after diagnosis. The gain from 1 in 3 to 4 in 10 represents about 67,000 persons this year. This 4 in 10, or about 40% is called the "observed" survival rate. When normal life expectancy is taken into consideration (factors such as dying of heart disease, accidents and diseases of old age) 49% will be alive 5 years after diagnosis. This is the "relative" survival rate, and is considered a more accurate yardstick of our battle against cancer.

Could more people be saved?

Yes. About 178,000 people with cancer will probably die in 1989 who might have been saved by earlier diagnosis and prompt treatment.

How many people will die?

This year about 502,000 will die of the disease—1,375 people a day, about one every 63 seconds. Of every five deaths from all causes in the U.S., one is from cancer. In 1988 an estimated 494,000 Americans died of cancer. In 1987 it was 483,000; in 1986 the figure was 469,376.

What is the national death rate?

There has been a steady rise in the age-adjusted** national death rate. In 1930 the number of cancer deaths per 100,000 population was 143. In 1940 it was 152. By 1950 it had risen to 158 and in 1986 the number was 171. The major cause of these increases has been cancer of the lung. Except for that form of cancer, age-adjusted cancer death rates for major sites are leveling off, and in some cases declining.

Can cancer be prevented?

Some cancers, not all. Most lung cancers are caused by cigarette smoking, and most skin cancers by frequent overexposure to direct sunlight. These cancers can be prevented by avoiding their causes. Certain cancers caused by occupational-environmental factors can be prevented by eliminating or reducing contact with carcinogenic agents. See Prevention section, pp. 18-22.

*These estimates of the incidence of cancer are based upon data from the National Cancer Institute's SEER Program (1983-1985). Non-melanoma skin cancer and carcinoma in situ have not been included in the statistics. The incidence of non-melanoma skin cancer is estimated to be over 500,000 cases annually.

**Age-adjusted—a method used to make valid statistical comparisons by assuming the same age distribution among different groups being compared.

BASIC DATA

HOW CANCER WORKS

Normally, the cells that make up the body reproduce themselves in an orderly manner so that worn-out tissues are replaced, injuries are repaired and growth of the body proceeds.

Occasionally, certain cells undergo an abnormal change and begin a process of uncontrolled growth and spread: One cell divides into two, those redivide into four, and so on. These cells may grow into masses of tissue called tumors—some benign and others malignant (cancerous).

The danger of cancer is that it invades and destroys normal tissue. In the beginning, cancer cells usually remain at their original site, and the cancer is said to be localized. Later, some cancer cells may invade neighboring organs or tissue. This occurs either by direct extension of growth or by becoming detached and carried through the lymph or blood systems to other parts of the body. This is called metastasis of a cancer.

This spread may be regional—confined to one region of the body—when cells are trapped by lymph nodes. If left untreated, however, the cancer is likely to spread throughout the body. That condition is known as advanced cancer, and usually results in death.

Because a case of cancer becomes progressively more serious with each stage, it is important to detect cancer as early as possible. Aids to early detection include cancer's Seven Warning Signals and the cancer risk factors.

TRENDS IN DIAGNOSIS AND TREATMENT

The diagnosis and treatment of cancer has become increasingly individualized. Early detection is followed by more precise staging, and the use of more than one kind of therapy, often in combination.

Some cancers, which only a few decades ago had a very poor outlook, are often being cured today; acute lymphocytic leukemia in children, Hodgkin's disease, Burkitt's lymphoma, Ewing's sarcoma (a form of bone cancer), Wilms' tumor (a kidney cancer in children), rhabdomyosarcoma (a cancer in certain muscle tissue), choriocarcinoma (placental cancer), testicular cancer, ovarian cancer and osteogenic sarcoma. Other cancers have not yet yielded to effective treatment, and are the focus of continuing research.

An outstanding example of progress is the improvement in the management of testicular cancer in young men. More precise diagnostic tools and staging allow better selection of treatment. The use of combinations of cancer drugs has resulted in remarkably improved survival. In 20 years, the 5-year survival rate of testicular cancer rose from 63% to 91%.

The following developments indicate the directions of current and future research:

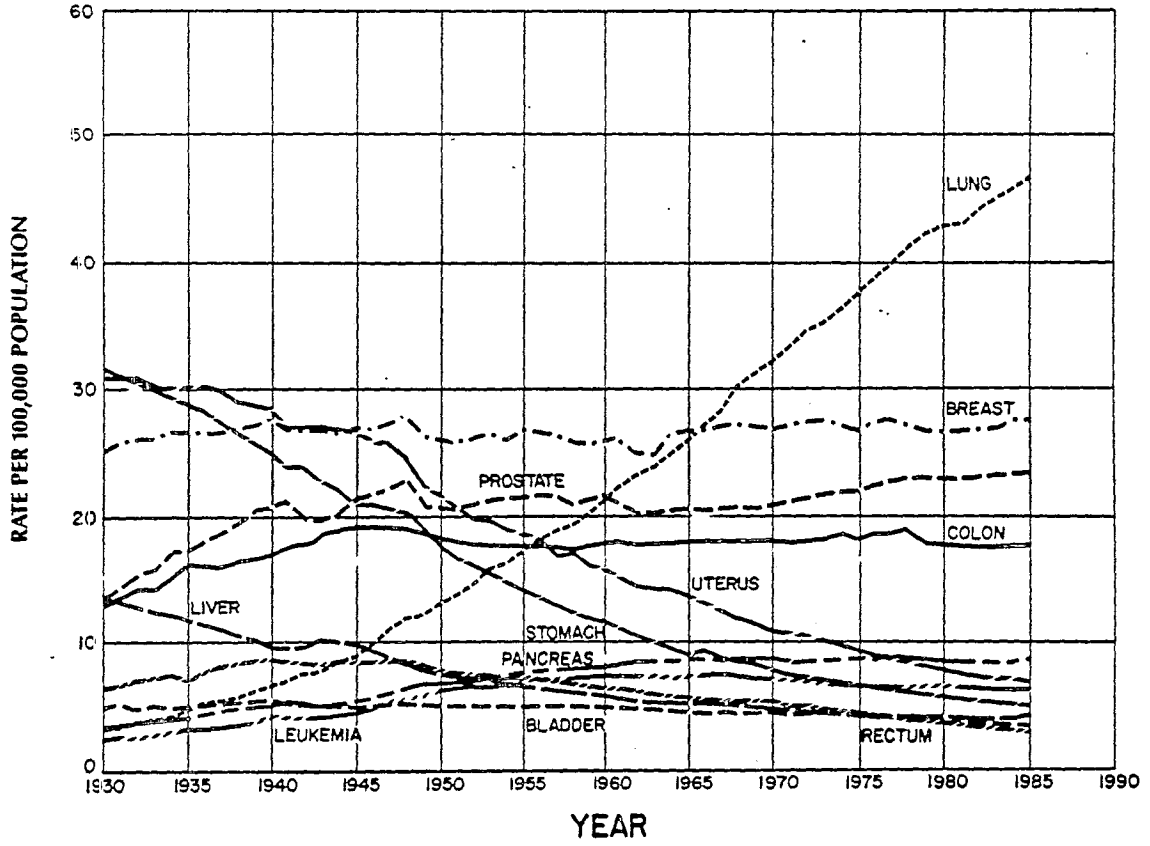
- New ways have been found to use an old drug, 5-fluorouracil, more effectively against metastatic colon cancer. By combining it with leukovorin it is a much more potent inhibitor of colon cancer cells.
- Analysis of oncogene products is a promising new means of predicting which tumors are likely to recur after surgery.
- Use of potent growth factors stimulates normal bone marrow cells to withstand very high doses of chemotherapeutic drugs.
- A genetic fusing of cancer cells with normal cells can produce disease-fighting "monoclonal antibodies"—specific antibodies tailored to seek out chosen targets on cancer cells. Their potential in the diagnosis and treatment of cancer is under study.
- New understanding of the causes of pain in cancer patients has increased the options for control. Regular use of oral pain medicines, infusions or injections of analgesics, procedures to interrupt pain pathways, are among the effective approaches available.
- Studies with agents like synthetic retinoids (cousins of vitamin A), and other substances are being undertaken to see if recurrences of certain cancers can be prevented. Another step is to see if these agents can reduce cancer in high risk groups.
- New approaches to drug therapy use combination chemotherapy and chemotherapy with surgery or radiation. New classes of agents are being tested for their effectiveness in treating patients resistant to drug therapies now in use.
- Many patients with primary bone cancer now are treated successfully by removing and replacing a section of bone rather than by amputating the leg or arm. Drugs and radiation therapy are being used effectively after bone cancer surgery, resulting in dramatic improvement in survival.
- New high technology diagnostic imaging techniques have replaced exploratory surgery for some cancer patients. Magnetic Resonance Imaging (MRI) is one example of such technology under study. It uses a huge electromagnet to detect tumors by sensing the vibrations of the different atoms in the body. Computerized tomography (CT scanning) uses X rays to examine the brain and other parts of the body. Cross-section pictures are constructed which show a tumor's shape and location more accurately than is possible with conventional x-ray techniques. For patients undergoing radiation therapy, CT scanning may enable the therapist to pinpoint the tumor more precisely to provide more accurate radiation dosage while sparing normal tissue.
- Immunotherapy holds the hope of enhancing the body's own disease-fighting systems to control cancer. Interferon, interleukin-2 and other biologic response modifiers are under study. Recently, interferon was made available as the treatment for hairy cell leukemia, a rare blood cancer of older Americans. Interleukin-2 is under very active research in the treatment of kidney cancer and melanoma.

BASIC DATA

This research area will take many years to find the proper role of these agents in cancer treatment.

- Many cancers are caused by a two-stage process through exposure to substances known as initiators and promoters. Research scientists are exploring ways of interrupting these processes to prevent the development of cancer.
- New technologies have made it possible to use bone marrow transplantation as an important treatment option in selected patients with aplastic anemia and leukemia. Bone marrow transplantation for other cancers is under study. The administration of larger doses of anti-cancer drugs or radiation therapy may be tolerated by some patients if their bone marrow is stored and later transplanted to restore marrow function (autologous bone marrow transplants).
- Hyperthermia is a way to increase the heat or temperature of the entire body or a part of the body. It is known that heat can kill cancer cells. A cell temperature of 45 degrees kills cancer cells. A temperature of 42-43 degrees makes the cell more susceptible to damage by ionizing radiation (X rays). Studies are underway to learn if hyperthermia can increase the effect of radiation or chemotherapy.
- With medical progress producing longer survival periods for many cancer patients, clinical concerns are expanding to include not only patients' physical well-being but also their psychosocial needs. The patient's and family's reactions to the disease, sexual concerns, employment and insurance needs, and ways to provide psychosocial support, have emerged as important areas of research and clinical care.
- Improvements in cancer treatment have made possible more conservative management of some early cancers. In early cancer of the larynx, many patients have been able to retain their larynx and their voice; in colorectal cancer, fewer permanent colostomies are needed; and the surgery required in many cases of breast cancer is often more limited.
- Prostatic ultrasound, a rectal probe using ultrasonic waves producing an image of the prostate, is currently being investigated as a potential means to increase the early detection of occult, or not clinically suspected, prostate cancer.
- Neoadjuvant chemotherapy has been successful against certain types of cancers. This involves giving chemotherapy to shrink the cancer and then removing it surgically.

CANCER DEATH RATES* BY SITE, UNITED STATES, 1930-85



*Rate for the population standardized for age on the 1970 U.S. population.
Sources of Data: National Center for Health Statistics and Bureau of the Census, United States.
Note: Rates are for both sexes combined except breast and uterus female population only and prostate male population only.

NEW CANCER CASES—1989

Estimated New Cancer Cases for All Sites Plus Major Sites, by State—1989

STATE	ALL SITES*	MAJOR SITES								
	Number of Cases	Female Breast	Colon & Rectum	Lung	Oral	Uterus	Prostate	Skin Melanoma	Pancreas	Leukemia
Alabama	18,000	2,400	2,300	2,800	450	950	2,100	400	500	450
Alaska	1,000	150	125	150	40	20	100	50	20	10
Arizona	13,000	1,800	1,700	1,900	350	550	1,500	300	350	375
Arkansas	11,300	1,100	1,500	1,900	200	400	1,000	350	350	300
California	101,000	14,200	13,500	15,400	3,500	5,000	10,000	3,200	2,600	2,800
Colorado	9,400	1,500	1,500	1,200	225	450	1,100	400	250	250
Connecticut	14,400	2,200	2,300	2,000	450	600	1,400	400	375	375
Delaware	2,800	400	450	500	40	125	275	70	70	80
Dist. of Columbia	3,200	450	400	450	250	150	450	60	90	60
Florida	65,500	8,300	10,200	10,600	2,200	2,800	7,600	1,800	1,700	1,600
Georgia	22,500	2,800	2,900	3,700	850	1,100	2,400	600	550	600
Hawaii	3,300	350	450	450	150	150	275	80	90	80
Idaho	3,500	500	475	475	60	125	425	150	80	125
Illinois	48,000	7,000	7,800	7,400	1,400	2,400	4,700	950	1,300	1,300
Indiana	23,200	3,200	3,700	3,800	650	1,200	2,200	600	550	550
Iowa	12,700	1,800	2,100	1,800	400	550	1,500	300	375	375
Kansas	9,900	1,400	1,600	1,600	300	450	1,200	200	300	325
Kentucky	16,800	2,100	2,500	3,000	450	850	1,600	350	375	425
Louisiana	17,500	2,200	2,200	3,000	550	750	1,700	300	500	400
Maine	5,500	750	950	850	150	250	600	100	150	150
Maryland	19,300	2,700	2,900	3,000	650	800	1,900	550	400	450
Massachusetts	28,400	4,800	4,500	3,800	800	1,000	2,600	800	700	700
Michigan	37,400	5,500	5,300	5,800	1,000	1,700	3,600	900	950	1,000
Minnesota	16,400	2,300	2,600	2,100	400	650	2,000	400	450	450
Mississippi	12,000	1,100	1,400	1,800	300	600	1,200	250	325	300
Missouri	23,500	3,200	3,900	3,700	700	1,200	2,000	600	650	700
Montana	3,200	500	425	425	60	150	400	90	100	100
Nebraska	6,400	900	1,100	900	150	350	750	175	225	175
Nevada	4,100	500	500	750	150	175	375	150	90	70
New Hampshire	4,000	650	650	600	80	200	400	125	125	90
New Jersey	36,500	5,500	6,200	5,300	1,200	1,800	3,500	950	1,000	850
New Mexico	4,500	600	600	550	125	175	550	80	150	150
New York	77,500	12,100	13,200	10,900	2,500	4,000	7,900	2,100	2,300	2,000
North Carolina	24,500	3,400	3,200	4,000	900	1,300	2,700	750	700	700
North Dakota	2,700	400	450	325	70	125	450	40	90	90
Ohio	49,000	6,800	7,700	7,900	1,400	2,200	4,700	1,200	1,300	1,300
Oklahoma	14,000	1,800	1,900	2,500	400	550	1,400	500	425	450
Oregon	11,800	1,700	1,600	2,000	300	425	1,200	350	325	350
Pennsylvania	59,000	8,800	10,000	8,600	1,700	2,500	5,300	1,600	1,500	1,500
Rhode Island	4,900	700	900	700	200	200	500	150	150	100
South Carolina	13,000	1,900	1,700	2,000	500	750	1,500	400	350	250
South Dakota	2,900	425	500	375	40	125	350	80	90	100
Tennessee	21,000	2,600	2,800	3,500	700	950	2,200	500	550	600
Texas	54,500	7,300	7,200	8,800	1,800	2,600	5,000	1,600	1,400	1,700
Utah	3,500	550	450	350	100	200	600	100	100	125
Vermont	2,300	350	375	350	80	150	250	50	50	90
Virginia	23,500	3,300	3,400	3,800	800	1,100	2,500	700	600	600
Washington	17,300	2,500	2,300	2,800	550	850	1,800	500	500	450
West Virginia	8,900	1,200	1,200	1,500	200	375	800	200	250	250
Wisconsin	20,200	3,100	3,200	2,700	450	900	2,300	400	550	650
Wyoming	1,300	225	200	200	30	30	150	50	30	30
United States	1,010,000	142,000	151,000	155,000	31,000	47,000	103,000	27,000	27,000	27,000
Puerto Rico	6,000	450	450	350	425	750	400	500	100	175

*Does not include carcinoma in situ or non-melanoma skin cancer.

These estimates are offered as a rough guide and should not be regarded as definitive. They are calculated according to the distribution of estimated 1989 cancer deaths by state. Especially note that year-to-year changes may only represent improvements in the basic data.

CANCER DEATHS—1989

Estimated Cancer Deaths for All Sites Plus Major Sites, by State—1989

STATE	ALL SITES		MAJOR SITES								
	Number of Deaths	Death Rate per 100,000 Population*	Female Breast	Colon & Rectum	Lung	Oral	Uterus	Prostate	Skin Melanoma	Pancreas	Leukemia
Alabama	8,900	214	700	950	2,600	125	200	550	100	425	300
Alaska	500	221	30	50	150	10	10	20	10	25	10
Arizona	6,500	180	550	700	1,800	100	50	400	70	300	225
Arkansas	5,600	190	350	600	1,800	60	100	300	80	300	225
California	50,000	181	4,400	5,500	14,100	950	900	2,800	700	2,500	1,800
Colorado	4,700	141	450	600	1,200	60	70	275	80	250	200
Connecticut	7,200	217	650	950	1,800	125	125	375	90	400	275
Delaware	1,400	250	125	175	450	10	20	60	10	60	50
Dist. of Columbia	1,700	264	175	175	400	70	60	125	10	100	50
Florida	32,500	182	2,500	4,100	9,800	600	400	2,100	400	1,600	1,000
Georgia	11,200	202	850	1,200	3,400	250	250	700	150	500	400
Hawaii	1,700	191	100	175	375	50	20	80	20	80	50
Idaho	1,800	158	150	175	400	20	25	125	30	100	80
Illinois	24,000	201	2,100	3,100	6,600	450	600	1,300	200	1,300	900
Indiana	11,500	217	950	1,500	3,500	175	300	600	125	550	425
Iowa	6,400	190	550	850	1,600	125	125	400	70	350	300
Kansas	4,900	171	425	650	1,300	90	100	350	50	275	225
Kentucky	8,400	207	650	1,000	2,800	125	175	425	80	375	300
Louisiana	8,800	212	650	900	2,800	150	175	475	80	450	300
Maine	2,800	199	225	400	800	40	60	175	20	150	90
Maryland	9,600	244	800	1,200	2,700	175	175	500	125	425	300
Massachusetts	14,100	220	1,500	1,900	3,500	250	275	750	175	650	475
Michigan	18,600	226	1,600	2,100	5,300	275	400	1,000	200	900	650
Minnesota	8,100	181	700	1,100	2,000	125	125	550	90	450	350
Mississippi	5,100	186	325	500	1,700	80	100	350	60	300	225
Missouri	11,800	196	950	1,500	3,400	175	250	550	125	550	450
Montana	1,600	186	150	175	375	20	30	100	20	100	70
Nebraska	3,300	173	300	450	800	40	70	200	40	200	175
Nevada	2,100	216	150	200	600	40	20	100	30	80	40
New Hampshire	2,100	197	200	250	550	30	40	90	30	100	70
New Jersey	18,100	230	1,600	2,500	4,900	325	375	950	225	900	550
New Mexico	2,300	168	200	250	500	30	40	150	20	125	70
New York	38,500	200	3,800	5,400	9,800	750	950	2,200	475	2,100	1,400
North Carolina	12,200	203	1,000	1,300	3,700	225	275	750	175	550	425
North Dakota	1,300	171	125	175	300	20	20	125	10	90	60
Ohio	24,000	227	2,100	3,100	7,300	400	600	1,300	250	1,200	850
Oklahoma	7,000	163	550	800	2,300	100	100	375	100	325	275
Oregon	5,900	198	500	650	1,800	100	75	350	70	300	225
Pennsylvania	29,500	221	2,600	4,000	7,800	475	700	1,500	350	1,400	1,000
Rhode Island	2,500	227	250	350	650	60	40	125	30	125	70
South Carolina	6,500	209	550	650	1,900	125	125	425	90	325	175
South Dakota	1,500	180	125	200	325	10	30	125	20	100	80
Tennessee	10,400	202	800	1,100	3,300	200	200	600	125	500	375
Texas	27,000	155	2,200	2,900	8,100	475	500	1,400	350	1,300	1,000
Utah	1,800	118	175	175	275	20	30	175	30	90	80
Vermont	1,200	196	100	150	275	20	30	70	10	60	50
Virginia	11,700	219	950	1,400	3,500	225	225	650	150	500	375
Washington	8,600	181	750	900	2,600	150	150	500	100	425	300
West Virginia	4,400	202	350	500	1,400	60	100	225	50	200	175
Wisconsin	10,000	197	950	1,300	2,500	125	175	650	90	500	425
Wyoming	700	128	70	75	175	10	10	30	10	40	30
United States	502,000	204	43,000	61,000	142,000	8,700	10,000	28,500	6,000	25,000	18,000
Puerto Rico	3,500	150	200	250	400	175	150	300	400	80	150

*Adjusted to the age distribution of the 1970 U.S. Census Population.

ESTIMATED NEW CANCER CASES AND DEATHS BY SEX FOR ALL SITES—1989*

	ESTIMATED NEW CASES			ESTIMATED DEATHS		
	Total	Male	Female	Total	Male	Female
ALL SITES	1,010,000*	505,000*	505,000*	502,000	266,000	236,000
Buccal Cavity & Pharynx (ORAL)	30,600	20,600	10,000	8,650	5,775	2,875
Lip	4,200	3,700	500	100	75	25
Tongue	6,000	3,900	2,100	1,950	1,300	650
Mouth	11,700	7,000	4,700	2,600	1,600	1,000
Pharynx	8,700	6,000	2,700	4,000	2,800	1,200
Digestive Organs	227,800	115,200	112,600	123,000	64,400	58,600
Esophagus	10,100	7,200	2,900	9,400	6,900	2,500
Stomach	20,000	11,900	8,100	13,900	8,200	5,700
Small Intestine	2,700	1,400	1,300	900	500	400
Large Intestine } (COLON-RECTUM)	107,000	50,000	57,000	53,500	26,000	27,500
Rectum } (COLON-RECTUM)	44,000	23,000	21,000	7,800	4,000	3,800
Liver & Biliary Passages	14,500	7,500	7,000	11,400	5,800	5,600
Pancreas	27,000	13,000	14,000	25,000	12,500	12,500
Other & Unspecified Digestive	2,500	1,200	1,300	1,100	500	600
Respiratory System	171,600	114,000	57,600	147,100	96,900	50,200
Larynx	12,300	10,000	2,300	3,700	3,000	700
LUNG	155,000	101,000	54,000	142,000	93,000	49,000
Other & Unspecified Respiratory	4,300	3,000	1,300	1,400	900	500
Bone	2,100	1,200	900	1,300	700	600
Connective Tissue	5,600	3,000	2,600	3,000	1,400	1,600
SKIN	27,000**	14,500**	12,500**	8,200†	5,200	3,000
BREAST	142,900***	900***	142,000***	43,300	300	43,000
Genital Organs	181,800***	109,900	71,900***	52,200	29,100	23,100
Cervix Uteri } (UTERUS)	13,000***	—	13,000***	6,000	—	6,000
Corpus, Endometrium } (UTERUS)	34,000	—	34,000	4,000	—	4,000
Ovary	20,000	—	20,000	12,000	—	12,000
Other & Unspecified Genital, Female	4,900	—	4,900	1,100	—	1,100
Prostate	103,000	103,000	—	28,500	28,500	—
Testis	5,700	5,700	—	350	350	—
Other & Unspecified Genital, Male	1,200	1,200	—	250	250	—
Urinary Organs	70,200	49,000	21,200	20,200	12,900	7,300
Bladder	47,100	34,500	12,600	10,200	6,900	3,300
Kidney & Other Urinary	23,100	14,500	8,600	10,000	6,000	4,000
Eye	1,900	1,000	900	300	150	150
Brain & Central Nervous System	15,000	8,200	6,800	11,000	6,000	5,000
Endocrine Glands	12,600	3,700	8,900	1,750	775	975
Thyroid	11,300	3,000	8,300	1,025	375	650
Other Endocrine	1,300	700	600	725	400	325
Leukemia	27,300	15,200	12,100	18,100	9,800	8,300
Lymphocytic Leukemia	13,000	7,500	5,500	7,000	3,900	3,100
Granulocytic Leukemia	13,300	7,200	6,100	10,600	5,600	5,000
Monocytic Leukemia	1,000	500	500	500	300	200
Other Blood & Lymph Tissues	51,800	27,000	24,800	27,400	14,100	13,300
Hodgkin's Disease	7,400	4,200	3,200	1,500	900	600
Non-Hodgkin's Lymphomas	32,800	16,800	16,000	17,300	8,900	8,400
Multiple Myeloma	11,600	6,000	5,600	8,600	4,300	4,300
All Other & Unspecified Sites	41,800	21,600	20,200	36,500	18,500	18,000

NOTE: The estimates of new cancer cases are offered as a rough guide and should not be regarded as definitive. Especially note that year-to-year changes may only represent improvements in the basic data. ACS six major sites appear in boldface caps.

*Carcinoma in situ and non-melanoma skin cancers are not included in totals. Carcinoma in situ of the uterine cervix accounts for more than 50,000 new cases annually, and carcinoma in situ of the female breast accounts for about 10,000 new cases annually. Non-melanoma skin cancer accounts for more than 500,000 new cases annually.

**Melanoma only. ***Invasive cancer only. †Melanoma 6,000; other skin 2,200

INCIDENCE ESTIMATES ARE BASED ON RATES FROM NCI SEER PROGRAM 1983-85.

SELECTED CANCER SITES

LUNG CANCER

Incidence: An estimated 155,000 new cases in 1989. The incidence rate in white males rose from 82.7 per 100,000 in 1982 to 84.2 in 1984. The incidence rate in white females and in black males and females also rose.

Mortality: An estimated 142,000 deaths in 1989. The age-standardized lung cancer death rate for women is higher than that of any other cancer. It has surpassed breast cancer which for over 50 years was the number one cancer killer of women.

Warning Signals: A persistent cough; sputum streaked with blood; chest pain; recurring attacks of pneumonia or bronchitis.

Risk Factors: Cigarette smoking; history of smoking 20 or more years; exposure to certain industrial substances such as asbestos, particularly for those who smoke. Involuntary smoking increases the risk. Exposure to radiation may also contribute to lung cancer.

Early Detection: Lung cancer is very difficult to detect early; symptoms often don't appear until the disease has advanced considerably. If a smoker quits at the time of early precancerous cellular changes, the damaged bronchial lining often returns to normal. If a smoker continues the habit, cells may form abnormal growth patterns that lead to cancer. Diagnosis may be aided by such procedures as the chest X ray, sputum cytology test and fiberoptic bronchoscopy.

Treatment: Treatment depends on the type of, and stage of lung cancer. Surgery, radiation therapy and chemotherapy are all options. For many localized cancers, surgery is usually the treatment of choice. Since the majority of patients with lung cancer have tumor spread, radiation therapy and chemotherapy are often combined with surgery. In small cell cancer of the lung, chemotherapy alone or combined with radiation has largely replaced surgery as the treatment of choice, with a large percentage of patients experiencing remission—in some cases, long-lasting remission.

Survival: Only 13% of lung cancer patients (all stages, whites and blacks) live five or more years after diagnosis. The rate is 33% for cases detected in a localized stage; but only 24% of lung cancers are discovered that early. Rates have improved only slightly over a recent 10-year period.

COLON AND RECTUM CANCER

Incidence: An estimated 151,000 new cases in 1989, including 107,000 of colon cancer and 44,000 of rectum cancer. Their combined incidence is second only to that of lung cancer (excluding common skin cancers).

Mortality: An estimated 61,300 deaths in 1989, second only to lung cancer. This includes 53,500 for colon cancer and 7,800 for rectum cancer.

Warning Signals: Bleeding from the rectum, blood in the stool, change in bowel habits.

Risk Factors: Personal or family history of colon and rectum cancer; personal or family history of polyps in the colon or rectum; inflammatory bowel disease.

Evidence suggests that bowel cancer may be linked to the diet. A diet high in fat and/or low in fiber content may be a significant causative factor.

Early Detection: The ACS recommends three tests as valuable aids in detecting colon and rectum cancer early in people without symptoms.

The digital rectal examination is performed by a physician during an office visit. The ACS recommends one every year after age 40.

The stool blood slide test is a simple method of testing the feces for hidden blood. The specimen is obtained by the patient at home, and returned to the physician's office, a hospital or clinic for examination. The ACS recommends the test every year after 50.

Proctosigmoidoscopy, known as the "procto," is an examination in which a physician inspects the rectum and lower colon with a hollow lighted tube. As the site of most colorectal cancers appears to be shifting higher in the colon, longer, flexible instruments are being used as well as the rigid scope. The ACS recommends a procto every 3 to 5 years after the age of 50, following two annual normal exams.

If any of these tests reveals possible problems, a physician may recommend more extensive studies, such as colonoscopy and a barium enema. Colonoscopes view the entire colon.

Treatment: Surgery, at times combined with radiation, is the most effective method of treating colorectal cancer. Chemotherapy is being studied to determine its possible role in treating advanced cases.

In cases of colon cancer, a permanent colostomy, the creation of an abdominal opening for the elimination of body wastes, is seldom needed, and is infrequently required for patients with rectal cancer. One report found permanent colostomies necessary for only 15% of patients whose rectal cancers are detected early. For those who do have permanent colostomies, the Society has a special patient assistance program. (See p. 25)

Survival: When colorectal cancer is detected and treated in an early, localized stage, the 5-year survival rate is 87% for colon cancer and 79% for rectal cancer, compared with 40% and 31% respectively, after the cancer has spread to other parts of the body.

SELECTED CANCER SITES

BREAST CANCER

Incidence: An estimated 142,900 new cases in the United States during 1989. About one out of 10 women will develop breast cancer at some time during her life.

Mortality: An estimated 43,300 deaths (43,000 females; 300 males) in 1989, in females, second only to lung cancer, now the foremost site of cancer deaths in women.

Warning Signals: Breast changes that persist such as a lump, thickening, swelling, dimpling, skin irritation, distortion, retraction or scaliness of the nipple, nipple discharge, pain or tenderness.

Risk Factors: Over age 50; personal or family history of breast cancer; never had children; first child after age 30.

Early Detection: The American Cancer Society recommends the monthly practice of breast self-examination (BSE) by women 20 years and older as a routine good health habit. Most breast lumps are not cancer, but only a physician can make a diagnosis.

The American Cancer Society and the National Cancer Institute, in their joint Breast Cancer Detection Demonstration program, found that mammography—a low-dose x-ray examination—could find cancers too small to be felt by the most experienced examiner.

Besides its effectiveness in screening women without symptoms, mammography is recognized as a valuable diagnostic technique for women who do have findings suggestive of breast cancer. Once a breast lump is found, mammography can help determine if there are other lesions in the same or opposite breast which are too small to be felt. All suspicious lumps should be biopsied for a definitive diagnosis—even when the mammogram is described as normal.

The Society recommends a mammogram every year for asymptomatic women age 50 and over, and a baseline mammogram for those 35 to 39. Asymptomatic women 40 to 49 should have mammography every 1-2 years. In addition, a professional physical examination of the breast is recommended every three years for women 20 to 40, and every year for those over 40.

Treatment: Several methods may be used, depending on the individual woman's preferences and medical situation—surgery varying from local removal of the tumor to mastectomy, radiation therapy, chemotherapy or hormone manipulation. Often two or more methods may be used in combination. Patients should discuss with their physicians possible options available concerning the specific management of their breast cancer.

New techniques in recent years have made breast reconstruction possible after mastectomy, and the cosmetic results are good. Reconstruction now has become an important part of treatment and rehabilitation. (See p. 25)

Survival: The 5-year survival rate for localized breast cancer has risen from 78% in the 1940's to 90% today. If the breast cancer is not invasive (in situ), the survival rate approaches 100%. If the cancer has spread, however, the rate is 60%.

Despite an increasing incidence of breast cancer, longer survival has helped to stabilize mortality rates over the last 50 years.

UTERINE CANCER

Incidence: An estimated 47,000 new invasive cases in 1989, including 13,000 cases of cancer of the cervix, and 34,000 cases of cancer of the endometrium or body of the uterus. Invasive cervical cancer incidence has steadily decreased over the years, while cancer in situ has risen in all groups. Cervical cancer is most common today among low socioeconomic groups but all groups are at risk. Endometrial cancer afflicts mostly mature women, and diagnosis usually is made between the ages of 55 and 69.

Mortality: An estimated 6,000 deaths in 1989 from cervical cancer, 4,000 from endometrial cancer. Overall, the death rate from uterine cancer has decreased more than 70% during the last 40 years, due mainly to the Pap test and regular checkups.

Warning Signals: Intermenstrual or postmenopausal bleeding or unusual discharge.

Risk Factors: For cervical cancer: early age at first intercourse, multiple sex partners. For endometrial cancer: history of infertility, failure of ovulation, prolonged estrogen therapy and obesity.

Early Detection: The Pap test, an examination under a microscope of cells from the cervix and body of the uterus, is a simple procedure which can be performed at appropriate intervals by physicians as part of every pelvic examination. For cervical cancer, women who are or have been sexually active, or have reached age 18 years, should have an annual Pap test and pelvic examination. After a woman has had three or more consecutive satisfactory normal annual examinations, the Pap test may be performed less frequently at the discretion of her physician.

The Pap test is highly effective in detecting early cancer of the uterine cervix; it is only 50% effective in detecting endometrial cancer. Women at high risk of developing endometrial cancer should have an endometrial tissue sample at menopause.

The hormone estrogen frequently is given to women during and after menopause to make up for the decline in estrogens normally produced by the ovaries. Estrogen helps to control menopausal symptoms such as hot flashes or thinning of the vaginal lining causing painful sexual intercourse. For mature women, there are certain risks associated with such treatment, including an increased risk of endometrial cancer. Women and their physicians should carefully discuss

SELECTED CANCER SITES

the use of postmenopausal estrogens in terms of the benefit and risk to the individual patient.

Treatment: Uterine cancers generally are treated by surgery or radiation, or by a combination of the two. In precancerous (in situ) stages, changes in the cervix may be treated by cryotherapy (the destruction of cells by extreme cold), by electrocoagulation (the destruction of tissue through intense heat by electric current) or by local surgery. Precancerous endometrial changes may be treated with the hormone progesterone.

Survival: The 5-year survival rate for all cervical cancer patients is 66%. For patients diagnosed early, however, the rate is 80-90%. Cancer in situ is virtually 100%. The figures for endometrial cancer are 83% all stages, 91% early and virtually 100% for endometrial precancerous lesions. During a recent 10-year period, there was moderate improvement for both uterine sites.

OVARIAN CANCER

Incidence: An estimated 20,000 new cases in the United States in 1989. It is estimated that about 1.4% or one out of every 70 newborn girls will develop ovarian cancer during her lifetime. It accounts for 4% of all cancers among women and 27% of the cancers of the female reproductive system.

Mortality: An estimated 12,000 deaths in 1989. Although ovarian cancer ranks second in incidence among gynecological cancers, it causes more deaths than any other cancer of the female reproductive system.

Warning Signals: Ovarian cancer is often "silent," showing no obvious signs or symptoms until late in its development. The most common sign is an enlarged abdomen caused by the collection of fluid. Rarely will there be abnormal vaginal bleeding. In women over 40, vague digestive disturbances (stomach discomfort, gas, distention) which persist and cannot be explained by any other cause may indicate the need for a thorough checkup for ovarian cancer.

Risk Factors: Risk for ovarian cancer increases with age, with highest rates for women 65-84. Women who have never had children are twice as likely to develop ovarian cancer as those who have. A number of interrelated reproductive factors, such as age at first live birth, age at first pregnancy, and number of pregnancies are all involved in varying degrees. In addition, years of ovulation, the product of a number of other interrelated factors such as length of pregnancies and oral contraceptive use (which may themselves actually decrease risk), are also tied to an observed increased risk. Breast and endometrial cancer increases a woman's chances of developing ovarian cancer twofold. Patients with colorectal cancer are at increased risk of ovarian cancer, although risk decreases over time following diagnosis of their colorectal cancer. Some rare genetic disorders are associated with increased risk. Incidence rates are higher in North America and Northern Europe, and lower in Asia and Africa. Rates are significantly higher for nuns, Jewish women, and women who have never been married.

Early Detection: Periodic, thorough pelvic examinations are important. *The Pap test, useful in detecting cervical cancer, does not reveal ovarian cancer.* Women over the age of 40 should have a cancer-related checkup every year.

Treatment: Surgery, radiation therapy and drug therapy are all options in the treatment of ovarian cancer. Surgical treatment usually includes the removal of one or both ovaries, the uterus (hysterectomy) and the fallopian tubes. In some very early tumors, only the involved ovary may be removed, especially in young women. In advanced disease, an attempt is made to remove all intra-abdominal disease to enhance the effect of chemotherapy.

Survival: If ovarian cancer is diagnosed and treated early, about 85% of such patients live 5 years or longer. However, when diagnosed in an advanced stage, the survival rate drops to 23%. It has improved with modern chemotherapeutic agents. Overall, the survival rate for ovarian cancer is 38%.

ORAL CANCER

Incidence: An estimated 31,000 new cases in 1989. Incidence is more than twice as high in males as in females, and is most frequent in men over age 40. Cancer can affect any part of the oral cavity, from lip to tongue to mouth and throat.

Mortality: An estimated 8,650 deaths in 1989.

Warning Signals: A sore that bleeds easily and doesn't heal; a lump or thickening; a reddish or whitish patch that persists. Difficulty in chewing, swallowing or moving tongue or jaws are often late changes.

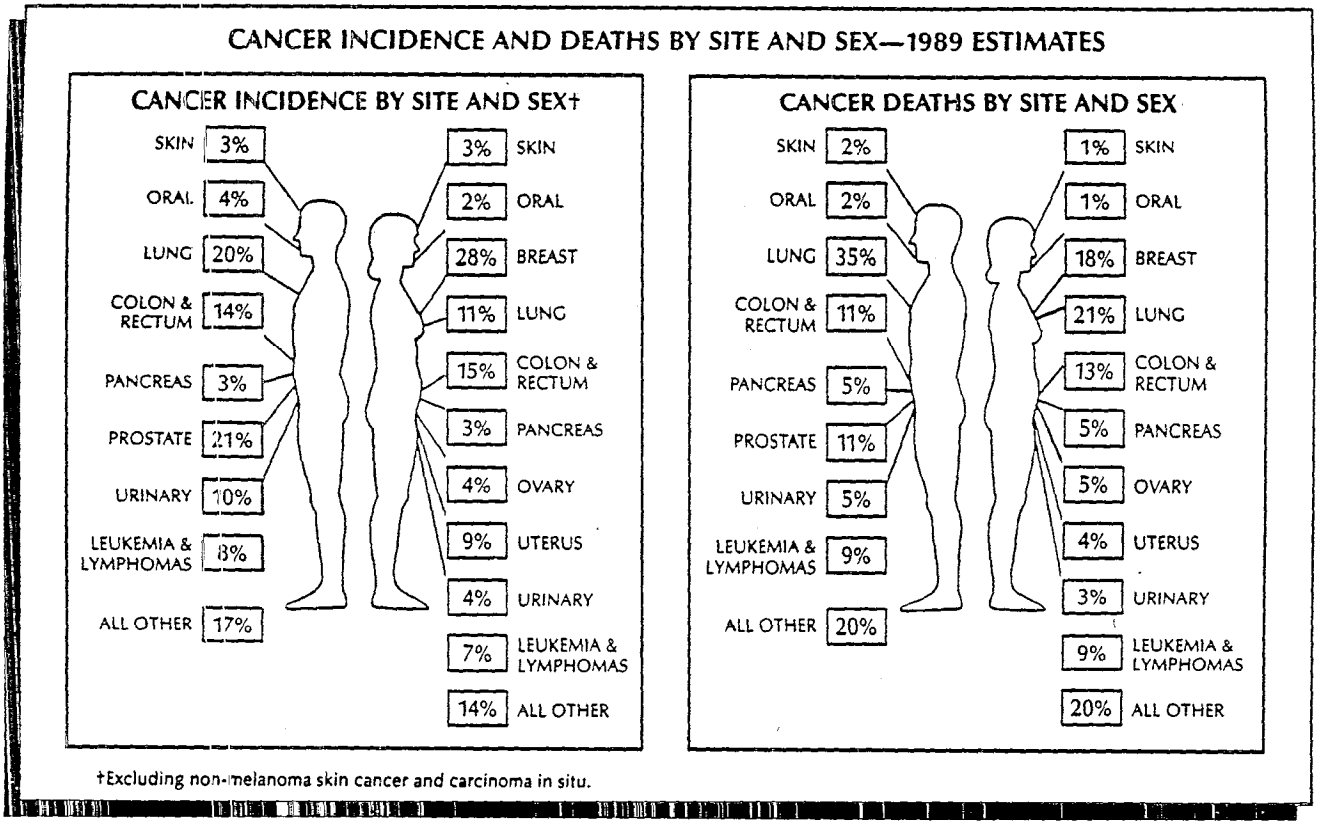
Risk Factors: Cigarette, cigar and pipe smoking; use of smokeless tobacco; excess use of alcohol.

Early Detection: Dentists and primary care physicians have the opportunity, during regular checkups, to see abnormal tissue changes and to detect cancer at an early and curable stage.

Treatment: Principal methods are radiation therapy and surgery. Chemotherapy is being studied as an aid to surgery in advanced disease.

Survival: Five-year survival rates vary substantially depending on the site. Rates range from 32% for cancer of the pharynx to 91% for lip cancer. Overall, 5-year survival for oral cancer patients is about 51%.

SELECTED CANCER SITES



†Excluding non-melanoma skin cancer and carcinoma in situ.

PROSTATE CANCER

Incidence: An estimated 103,000 new cases in the United States during 1989. About one out of 11 men will develop prostate cancer at some time during his lifetime. The third highest incidence of cancer in men, next to skin cancer and lung cancer.

Mortality: An estimated 28,500 deaths in 1989, the third leading cause of cancer deaths in men.

Warning Signals: Most signs or symptoms of prostate cancer are nonspecific, and do not distinguish from benign conditions such as infection or prostate enlargement. These include weak or interrupted flow of urine; inability to urinate or difficulty in starting urination; need to urinate frequently, especially at night; blood in the urine; urine flow that is not easily stopped; painful or burning urination; continuing pain in lower back, pelvis or upper thighs.

Risk Factors: Incidence increases with age through the most advanced ages; about 80% of all prostate cancers are diagnosed in men over the age of 65. The disease is more common in northwest Europe and North America; rare in the Near East, Africa, Central and South America. Black Americans have the highest rate of incidence in the world for reasons not currently known. There is some familial association, but it is unclear whether this is due to genetic or environmental association. Dietary fat may be a factor, based on studies conducted internationally. Workers who work with cadmium are found to be at slightly higher risk. Studies of migrating populations have suggested that environmental factors, such as diet and lifestyle, may play an important role in the risk of developing cancer of the prostate.

Early Detection: Every man over 40 should have a rectal exam as part of his regular annual physical checkup. A new technique, prostate ultrasound is being investigated for the early detection of small non-palpable cancers. This new approach may be of special benefit to high risk men. Men over 40 should be alert to changes such as urinary difficulties, continuing pain in lower back, pelvis or upper thighs, and should see their physician immediately should any occur. The key to saving lives from prostate cancer is early detection and treatment.

Treatment: Surgery, alone or in combination with radiation and/or hormones, and anticancer drugs are all options available in the treatment of prostate cancer. Surgery or radiation therapy may be the treatment chosen to cure prostate cancer if it is found in an early localized state. Hormone treatment and anticancer drugs also may control prostate cancer for long periods by shrinking the size of the tumor and greatly relieving pain.

Survival: Sixty-four percent of all prostate cancers are discovered while still localized within the general region of the prostate; 84% of all patients whose tumors are diagnosed at this stage are alive 5 years after treatment. Survival rates for all stages combined have steadily improved since 1940, and in the last 20 years have increased from 48% to 71%.

SELECTED CANCER SITES

BLADDER CANCER

Incidence: An estimated 47,000 new cases of bladder cancer in 1989; 34,500 in males, 12,500 in females. Bladder cancers account for 7% of the new cancer cases diagnosed each year in men and 3% in women. Bladder cancer is the 5th most common form of cancer in males and 10th most common form of cancer in females in this country.

Mortality: An estimated 10,200 deaths in 1989 from bladder cancers, the 8th leading cause of cancer deaths in males and 14th in females.

Warning Signals: Blood in the urine. Usually associated with increased frequency of urination.

Risk Factors: Smoking is the greatest risk factor in bladder cancer, with smokers experiencing twice the risk of nonsmokers. Smoking is estimated to be responsible for about 49% of the bladder cancers among men and 10% among women. Overall, the incidence rate of bladder cancer is 4 times as great among men as women, and higher in whites than in blacks. People living in urban areas, and dye, rubber and leather workers also are at higher risk. Coffee and artificial sweeteners have been found to increase cancer risk in a few studies but most studies have not found an increased risk.

Diagnosis: Diagnosis of bladder cancer is achieved by examination of the bladder wall with a cystoscope, a slender tube fitted with a lens and light that can be inserted into the tract through the urethra.

Treatment: Surgery, alone or in combination with other treatments, is used in 92% of cases.

Survival: The 5-year survival rate for bladder cancer is 88% when detected in an early stage. For those cancers more advanced, the survival rate drops to 41%.

SKIN CANCER

Incidence: Over 500,000 cases a year, the vast majority of which are highly curable basal or squamous cell cancers. They are more common among individuals with lightly pigmented skin, living at latitudes near the equator. The most serious skin cancer is malignant melanoma, which strikes about 27,000 persons each year. The incidence of melanoma is increasing at the rate of 3.4% per year.

Mortality: An estimated 8,200 deaths this year, 6,000 from malignant melanoma, and 2,200 due to other skin cancers.

Warning Signals: Any unusual skin condition, especially a change in the size or color of a mole or other darkly pigmented growth or spot. Scaliness, oozing, bleeding or the appearance of a bump or nodule, the spread of pigment beyond the border, a change in sensation, itchiness, tenderness or pain are all warning signs of melanoma.

Risk Factors: Excessive exposure to the sun; fair complexion; occupational exposure to coal tar, pitch, creosote, arsenic compounds or radium. Among blacks, because of heavy skin pigmentation, skin cancer is negligible. One study has found that severe sunburn in childhood carries with it an excessive risk of melanoma in later life.

Prevention: Avoid the sun between 10 a.m. and 3 p.m. when ultraviolet rays are strongest, and use protective clothing. Use one of a number of sunscreen preparations, especially those containing such ingredients as PABA (para-aminobenzoic acid). They come in varying strengths, ranging from those that permit gradual tanning to those allowing practically no tanning at all. Children, in particular, should be protected from traumatic sunburns.

Early Detection: Early detection is critical. Recognition of changes in or the appearance of new skin growths is the best way to find early skin cancer. Basal and squamous cell skin cancers often take the form of a pale, waxlike, pearly nodule, or a red scaly, sharply outlined patch. A sudden or continuous change in a mole's appearance should be checked by a physician. Melanomas often start as small, mole-like growths that increase in size, change color, become ulcerated and bleed easily from a slight injury. There is a simple ABCD rule that will help individuals remember the warning signs of melanoma: **A is for asymmetry.** One half of the mole does not match the other half. **B is for border irregularity.** The edges are ragged, notched or blurred. **C is for color.** The pigmentation is not uniform. **D is for diameter greater than 6 millimeters.** Any sudden or continuing increase in size should be of special concern.

Adults should practice skin self-examination once a month.

Treatment: There are four methods of treatment: surgery (used in 90% of cases), radiation therapy, electrodesiccation (tissue destruction by heat), or cryosurgery (tissue destruction by freezing) for early skin cancer.

For malignant melanoma, adequate surgical excision of the primary growth is indicated. Nearby lymph nodes may be removed. The microscopic examination of all suspicious moles is essential. Advanced cases of melanoma are treated on an individual basis.

Survival: For basal cell and squamous cell cancers, cure is highly likely with early detection and treatment. Malignant melanoma can spread to other parts of the body quickly. However, when detected in its earliest stages, with proper treatment, it is highly curable.

The overall 5-year survival rate for white patients with malignant melanoma is 80% compared with 95% for patients with other kinds of skin cancer. The 5-year survival rate for localized malignant melanoma is 89%; however, the survival rate, once melanoma has spread, is 39%.

SELECTED CANCER SITES

PANCREATIC CANCER

Incidence: An estimated 27,000 new cases in the United States in 1989. Pancreatic cancer is the 5th leading cancer killer. The incidence rate of pancreatic cancer among U.S. blacks is about 1.5 times higher than for whites.

Mortality: An estimated 25,000 deaths in 1989 due to pancreatic cancer. From 1954 to 1984, the death rates for pancreatic cancer in the United States rose 12% to 10.2 deaths per 100,000 men. During the same period, the death rates for women rose 26% to 7.2 deaths per 100,000 women.

Warning Signals: Cancer of the pancreas is a "silent" disease, one that occurs without symptoms until it is advanced.

Risk Factors: Risk increases with age after age 30, with the highest frequency of incidence occurring between ages 65 and 79. Smoking is a major risk factor; incidence is more than twice as high for smokers versus nonsmokers. The disease is 30% more common in men, and occurs about 50% more frequently in black, versus white Americans. Some studies, as yet unconfirmed, suggest an association with chronic pancreatitis, diabetes and cirrhosis. High-fat diets may be a risk factor; countries with higher fat consumption levels have higher pancreatic cancer rates. Coffee has been investigated as a possible risk factor, but no conclusive evidence is currently available.

Early Detection: Research has focused on ways to diagnose pancreatic cancer before it is advanced enough to cause symptoms. Ultrasound and CT scans are being tried, but to date only a biopsy yields a certain diagnosis.

Prevention: Very little is known about what causes the disease, or how to prevent it.

Treatment: Surgery, radiation therapy and anti-cancer drugs are used to treat pancreatic cancer, but so far have had little influence on outcome. In 59% of cases, diagnosis is so late that none of these is used.

Survival: Only 4% of patients live more than 3 years after diagnosis. The 2% of patients whose cancers occur in the insulin-producing cells, and not the duct cells of the pancreas tend to live longer; about 30% of these patients live more than 3 years after diagnosis.

LEUKEMIA

Incidence: An estimated 27,300 new cases in 1989, about half of them acute leukemia, and half of them chronic leukemia. Although it is often thought of as primarily a childhood disease, leukemia strikes many more adults (25,000 cases per year compared with 2,300 in children). Acute lymphocytic leukemia accounts for about 1,800 of the cases of leukemia among children, whereas in adults the most common types are acute granulocytic (about 8,000 cases annually), and chronic lymphocytic (9,600 cases annually).

Mortality: An estimated 18,100 deaths in 1989.

Warning Signals: Symptoms of acute leukemia in children can appear suddenly. Early signs may include fatigue, paleness, weight loss, repeated infections, easy bruising, nose bleeds or other hemorrhages. Chronic leukemia can progress slowly and with few symptoms.

Risk Factors: Leukemia, a cancer of the bloodforming tissues, strikes both sexes and all ages. Causes of most cases are unknown. Individuals with Down's syndrome (mongolism) and certain other hereditary abnormalities have higher than normal incidence of leukemia. It has also been linked to excessive exposure to radiation and certain chemicals such as benzene.

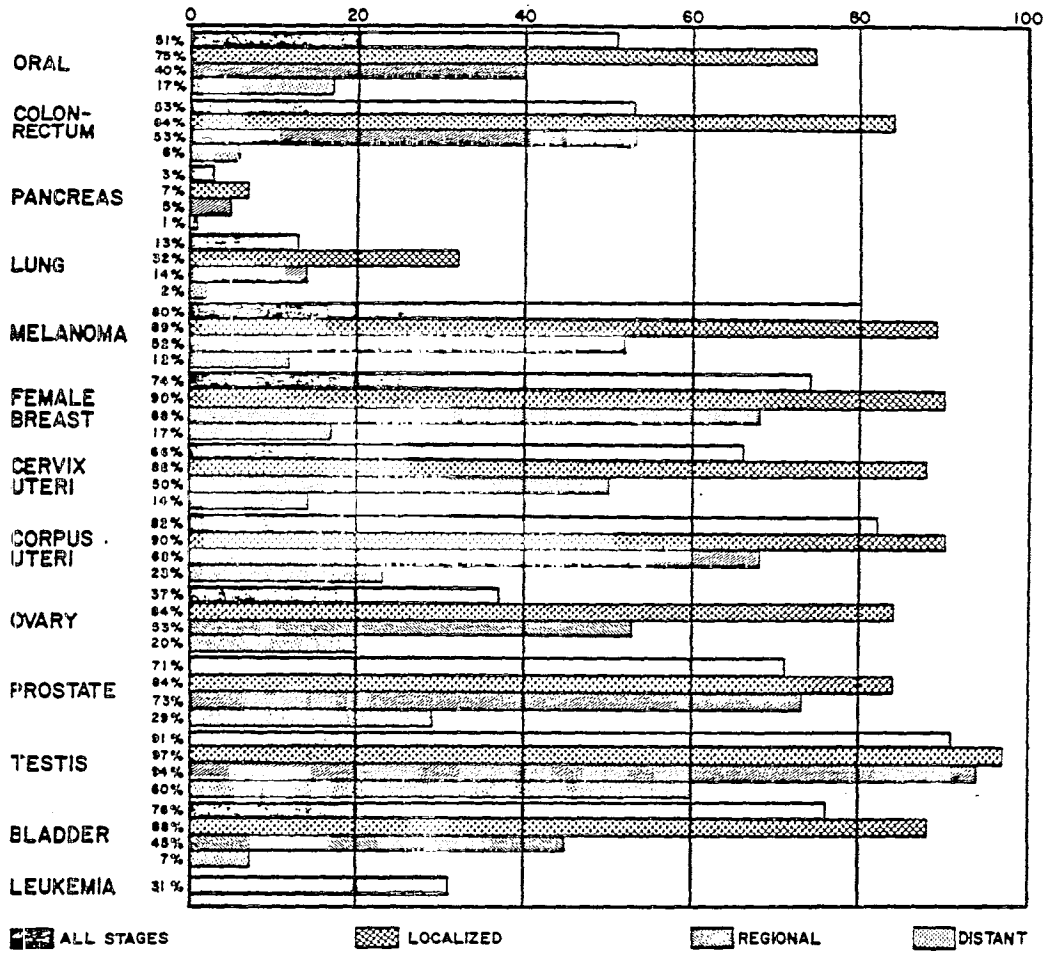
Early Detection: Leukemia may be difficult to diagnose early because symptoms often appear to be those of other less serious conditions. When a physician does suspect leukemia, a diagnosis can be made through blood tests and an examination of bone marrow.

Treatment: Chemotherapy is the most effective method of treating leukemia. Today, continuing research in leading U.S. medical centers is yielding new and better drugs for treating leukemia patients. A variety of anticancer drugs are used, either in combinations or as single agents. To prevent persistence of hidden cells, therapy of the central nervous system has become standard treatment, especially in acute lymphocytic leukemia. Under appropriate conditions, bone marrow transplantation may be useful in the treatment of certain leukemias.

When leukemia occurs, millions of abnormal, immature white blood cells are released into the circulatory systems. These abnormal cells crowd out normal white cells to fight infection, platelets to control hemorrhaging and red blood cells to prevent anemia. Transfusions of blood components and antibiotics are used as supportive treatments.

Survival: The overall, average 5-year survival rate for white patients with leukemia is 33%, due partly to very poor survival of patients with some types of leukemia such as acute granulocytic. The 5-year survival rate for black patients is 28%. Over the last 30 years, however, there has been a dramatic improvement in survival of patients with acute lymphocytic leukemia: From a 5-year survival of 4% for white males diagnosed in the early 1960's to 27% in the early 1970's to 46% around 1980; for white females diagnosed in the same time periods, from 3% to 29% to 52%. In white children, the improvement has been from 4% to 68%. Moreover, in some medical centers, optimum treatment has raised survival of children with acute lymphocytic leukemia up to 75%.

FIVE-YEAR CANCER SURVIVAL RATES* FOR SELECTED SITES



*Adjusted for normal life expectancy.
This chart is based on cases diagnosed in 1979-1984.

Source: Surveillance and Operations Research Branch, National Cancer Institute.

HOW TO ESTIMATE CANCER STATISTICS LOCALLY

Community Population	Estimated No. Who Are Alive, Saved from Cancer	Estimated No. Cancer Cases Under Medical Care in 1989	Estimated No. Who Will Die of Cancer in 1989	Estimated No. of New Cases in 1989	Estimated No. Who Will Be Saved from Cancer in 1989	Estimated No. Who Will Eventually Develop Cancer	Estimated No. Who Will Die of Cancer if Present Rates Continue
1,000	10	5	1	3	1	280	180
2,000	20	11	4	7	3	560	360
3,000	30	16	5	10	4	840	540
4,000	40	21	7	13	5	1,120	720
5,000	50	26	9	16	6	1,400	900
10,000	100	52	18	33	12	2,800	1,800
25,000	250	131	45	79	30	7,000	4,500
50,000	500	262	90	158	59	14,000	9,000
100,000	1,000	525	180	325	122	28,000	18,000
200,000	2,000	1,050	360	650	244.	56,000	36,000
500,000	5,000	2,625	900	1,575	590	140,000	90,000

NOTE: The figures can only be the roughest approximation of actual data for your community and should be used with caution. It is suggested that every effort be made to obtain actual data from a Registry source.

CANCER BY AGE AND RACE*

BLACK AMERICANS

A study of cancer rates over several decades shows that the cancer incidence rate for blacks is higher than for whites, and that the death rate is also higher. Over a 30-year period, black male cancer death rates rose by 77% compared to a 10% increase in black females. Incidence rates in blacks also have increased in both males and females.

The overall cancer incidence rate for blacks went up 27%, while for whites it increased 12%. Cancer mortality has increased in both races, but the rate for blacks is greater than for whites. The rates were virtually the same 30 years ago. Since then, cancer death rates in whites have increased 10%, while black rates have increased almost 50%.

Cancer sites where blacks had significantly higher increases in incidence and mortality rates included the lung, colon-rectum, prostate and esophagus. Esophageal cancer, long considered mainly a disease of males, remained about the same in whites and rose rapidly in blacks of both sexes.

The incidence of invasive cancer of the uterine cervix dropped in both black and white women, although the incidence in blacks is still double that in whites. However, the rate for endometrial cancer—or cancer of the body of the uterus—for white women is almost double that of black women.

Survival rates for patients diagnosed between 1974 and 1982 were compared for whites and blacks. More whites than blacks had cancer diagnosed in an early, localized stage when the chances of cure are best: 39% for whites versus 33% for blacks.

In a survey done for the ACS by the Gallup Organization in December 1987, the public's awareness and use of cancer tests was determined. The survey showed that 93% of white women knew of the Pap test and that 88% had had the test at some time, while 92% of black women knew of it and 79% had had it. For proctoscopic exams, 60% of the white population were aware of the procedure and 29% had had it at some time. For blacks, only 49% were aware of it and 22% had had it.

THE ECONOMICALLY DISADVANTAGED

A 1986 ACS Special Subcommittee report, "Cancer in the Economically Disadvantaged" found that cancer survival, and in some cases incidence, are related to socioeconomic factors such as the availability of health services. The report also found that ethnic differences in cancer are secondary to socioeconomic factors, and that there are higher rates of cancer mortality for patients of low socioeconomic status compared to those in higher brackets. Estimates suggest that at least half of the differences in survival rates are due to late diagnosis among economically disadvantaged patients, pointing up the need for more effective early detection programs and better access to treatment among this segment of the American population.

HISPANIC-AMERICANS

A recent ACS-sponsored report described Hispanic attitudes toward cancer, cancer risk reduction and early detection. The study, conducted for the Society by the firm of Clark, Martire and Bartolomeo, Inc., underscored an urgent need for extensive cancer education and information programs directed to Hispanic-Americans. Survey findings showed that Hispanic-Americans are not adequately aware of most of the warning signals of cancer or of ways to reduce cancer risk, and that they tend not to seek early detection or treatment. The study identified the key psychological, cultural and economic barriers hindering the fight against cancer in the Hispanic-American community.

CHILDREN

Incidence: An estimated 6,600 new cases in 1989, making it rare as a childhood disease. Common sites include the blood and bone marrow, bone, lymph nodes, brain, nervous system, kidneys and soft tissues.

Mortality: An estimated 1,800 deaths in 1989, about half of them from leukemia. Despite its rarity, cancer is the chief cause of death by disease in children between the ages of 3 and 14. Mortality has declined from 8.3 per 100,000 in 1950 to 3.5 in 1986.

Early Detection: Cancers in children often are difficult to recognize. Parents should see that their children have regular medical checkups, and be alert to any unusual symptoms that persist. They include: unusual mass or swelling; unexplained paleness and loss of energy; sudden tendency to bruise; persistent, localized pain or limping; prolonged, unexplained fever or illness; frequent headaches, often with vomiting; sudden eye or vision changes; and excessive, rapid weight loss.

Some of the main childhood cancers are:

Leukemia: See preceding section.

Osteogenic Sarcoma and *Ewing's Sarcoma* are bone cancers. There may be no pain at first, but swelling in the area of the tumor is often a first sign.

CANCER BY AGE AND RACE

Neuroblastoma can appear anywhere but usually in the abdomen, where a swelling occurs.

Rhabdomyosarcoma, the most common soft tissue sarcoma, can occur in the head and neck area, genito-urinary area, trunk and extremities.

Brain Cancers in early stages may cause headaches, blurred or double vision, dizziness, difficulty in walking or handling objects, and nausea.

Lymphomas, and *Hodgkin's Disease* are cancers that involve the lymph nodes, and also may invade bone marrow and other organs. They may cause swelling of lymph nodes in the neck, armpit or groin. Other symptoms may include general weakness and possibly fever.

Retinoblastoma, or an eye cancer, usually occurs in children under the age of four. When detected early, cure is possible with appropriate treatment.

Wilms' Tumor, a kidney cancer, may be recognized by a swelling or lump in the abdomen.

Treatment: Childhood cancers can be treated by a combination of therapies, coordinated by a team of experts. They include oncologic physicians, pediatric nurses, social workers, psychologists and others who assist children and their families.

Survival: Five-year survival rates vary considerably, depending on the site. Among those for white children: bone cancer, 48%; neuroblastoma, 56%; brain and central nervous system, 56%; Wilms' tumor (kidney), 82%; and Hodgkin's disease, 91%. (Data for black children is insufficient.)

*Figures for cancer incidence are from the National Cancer Institute National Surveys, 1947, and the NCI SEER Program, 1973-1985; those for cancer mortality are from the National Center for Health Statistics, 1953-55 to 1983-85.

TRENDS IN SURVIVAL BY SITE OF CANCER, BY RACE
Cases Diagnosed in 1960-63, 1970-73, 1974-76, 1977-78, 1979-84

	WHITE					BLACK				
	RELATIVE 5-YEAR SURVIVAL					RELATIVE 5-YEAR SURVIVAL				
SITE	1960-63[1]	1970-73[1]	1974-76[2]	1977-78[2]	1979-84[2]	1960-63[1]	1970-73[1]	1974-76[2]	1977-78[2]	1979-84[2]
All Sites	39%	43%	50%	50%	50%	27%	31%	38%	38%	37%
Oral Cavity & Pharynx	45	43	54	53	54	–	–	35	35	31
Esophagus	4	4	5	6	7	1	4	4	2	5
Stomach	11	13	14	15	16*	8	13	15	16	17
Colon	43	49	50	52	54*	34	37	45	44	49
Rectum	38	45	48	50	52*	27	30	40	40	34
Liver	2	3	4	3	3	–	–	1	1	5
Pancreas	1	2	3	2	3	1	2	2	3	5
Larynx	53	62	66	69	66	–	–	58	59	55
Lung & Bronchus	8	10	12	13	13*	5	7	11	10	11
Melanoma of Skin	60	68	78	81	80*	–	–	62##	–	61#
Breast (females)	63	68	74	75	75*	46	51	62	62	62
Cervix Uteri	58	64	69	69	67	47	61	61	63	59
Corpus Uteri	73	81	89	87	83*	31	44	61	58	52*
Ovary	32	36	36	37	37*	32	32	41	40	36
Prostate Gland	50	63	67	70	73*	35	55	56	64	60*
Testis	63	72	78	86	91*	–	–	77#	–	82#
Urinary Bladder	53	61	73	75	77*	24	36	47	53	57*
Kidney & Renal Pelvis	37	46	51	50	51	38	44	49	54	53
Brain & Nervous System	18	20	22	23	23	19	19	27	24	31
Thyroid Gland	83	86	92	92	93	–	–	88	92	95
Hodgkin's Disease	40	67	71	73	74*	–	–	67#	79#	69
Non-Hodgkin's Lymphoma	31	41	47	48	49*	–	–	47	46	49
Multiple Myeloma	12	19	24	24	24	–	–	28	30	29
Leukemia	14	22	34	37	32	–	–	30	31	27

Source: Surveillance and Operations Research Branch, National Cancer Institute.

[1] Rates are based on End Results Group data from a series of hospital registries and one population-based registry.

[2] Rates are from the SEER Program. They are based on data from population-based registries in Connecticut, New Mexico, Utah, Iowa, Hawaii, Atlanta, Detroit, Seattle-Puget Sound and San Francisco-Oakland. Rates are based on follow-up of patients through 1985.

* The difference in rates between 1974-76 and 1979-84 is statistically significant ($p < .05$).

The standard error of the survival rate is between 5 and 10 percentage points.

The standard error of the survival rate is greater than 10 percentage points.

– Valid survival rate could not be calculated.

PREVENTION

PRIMARY PREVENTION REFERS TO STEPS THAT MIGHT BE TAKEN TO AVOID THOSE FACTORS THAT MIGHT LEAD TO THE DEVELOPMENT OF CANCER.

SMOKING	Cigarette smoking is responsible for 85% of lung cancer cases among men and 75% among women—about 83% overall. Smoking accounts for about 30% of all cancer deaths. Those who smoke two or more packs of cigarettes a day have lung cancer mortality rates 15 to 25 times greater than nonsmokers.
SUNLIGHT	Almost all of the more than 500,000 cases of non-melanoma skin cancer developed each year in the U.S. are considered to be sun-related. Recent epidemiological evidence shows that sun exposure is a major factor in the development of melanoma and that the incidence increases for those living near the equator. (See Selected Cancer Sites: Skin Cancer)
ALCOHOL	Oral cancer and cancers of the larynx, throat, esophagus, and liver occur more frequently among heavy drinkers of alcohol. (See Selected Cancer Sites: Oral Cancer)
SMOKELESS TOBACCO	Increased risk factor for cancers of the mouth, larynx, throat, and esophagus. Highly habit forming. (See Selected Cancer Sites: Lung Cancer and Oral Cancer)
ESTROGEN	For mature women, certain risks associated with estrogen treatment to control menopausal symptoms, including an increased risk of endometrial cancer. Use of estrogen by menopausal women needs careful discussion by the woman and her physician. (See Selected Cancer Sites: Uterine Cancer)
RADIATION	Excessive exposure to radiation can increase cancer risk. Most medical X rays are adjusted to deliver the lowest dose possible without sacrificing image quality. The ACS believes there is a potential problem of radon in the home. If levels are found to be too high, remedial actions should be taken.
OCCUPATIONAL HAZARDS	Exposure to a number of industrial agents (nickel, chromate, asbestos, vinyl chloride, etc.) increases risk. Risk factor greatly increased when combined with smoking.
NUTRITION	Risk for colon, breast and uterine cancers increases for obese people. High-fat diet may be a factor in the development of certain cancers such as breast, colon and prostate. High-fiber foods may help reduce risk of colon cancer, and can be a wholesome substitute for high-fat diets. Foods rich in vitamins A and C may help lower risk for cancers of larynx, esophagus, stomach and lung. Eating cruciferous vegetables may help protect against certain cancers. Salt-cured, smoked and nitrite-cured foods have been linked to esophageal and stomach cancer. The heavy use of alcohol, especially when accompanied by cigarette smoking or chewing tobacco, increases risk of cancers of the mouth, larynx, throat, esophagus, and liver. (See above)

SECONDARY PREVENTION REFERS TO STEPS TO BE TAKEN TO DIAGNOSE A CANCER OR PRECURSOR AS EARLY AS POSSIBLE AFTER IT HAS DEVELOPED.

COLORECTAL TESTS	The ACS recommends three tests for the early detection of colon and rectum cancer in people without symptoms. The digital rectal examination, performed by a physician during an office visit, should be performed every year after the age of 40; the stool blood test is recommended every year after 50; and the proctosigmoidoscopy examination should be carried out every 3 to 5 years after the age of 50 following two annual exams with negative results. (See Selected Cancer Sites: Colon and Rectum Cancer)
PAP TEST	For cervical cancer, women who are or have been sexually active, or have reached age 18 years, should have an annual Pap test and pelvic examination. After a woman has had three or more consecutive satisfactory normal annual examinations, the Pap test may be performed less frequently at the discretion of her physician.
BREAST CANCER DETECTION	The ACS recommends the monthly practice of breast self-examination (BSE) by women 20 years and older as a routine good health habit. Physical examination of the breast should be done every three years from ages 20-40 and then every year. The ACS recommends a mammogram every year for asymptomatic women age 50 and over, and a baseline mammogram between ages 35 and 39. Women 40 to 49 should have mammography every 1-2 years, depending on physical and mammographic findings.

PREVENTION

CANCER-RELATED CHECKUP GUIDELINES

Guidelines for the early detection of cancer in people without symptoms are recommended by the American Cancer Society as follows:

A cancer-related checkup:

- every 3 years for those 20-40 years of age.
- every year for those 40 and over.

The Society advises that you talk with your doctor. Ask how the guidelines apply to you. The checkup should always include health counseling (such as tips on quitting smoking) and examinations for cancer of the thyroid, testes, prostate, mouth, ovaries, skin and lymph nodes.

In particular:

- Ages 20-40—For breast cancer, an examination by a physician every three years, a self-exam every month, and one baseline breast X ray between the ages of 35 and 39. For cervical cancer, women who are or have been sexually active, or have reached age 18, should have an annual Pap test and pelvic examination. After a woman has had three or more consecutive satisfactory normal annual examinations, the Pap test may be performed less frequently at the discretion of her physician.
- Ages 40 and over—For breast cancer, a professional exam every year, a self-exam every month and a breast X ray every 1-2 years for those 40-49; every year for those 50 and over. For cervical cancer, women who are or have been sexually active, or have reached age 18 years, should have an annual Pap test and pelvic examination. After a women has had three or more consecutive satisfactory normal annual examinations, the Pap test may be performed less frequently at the discretion of her physician. For women at risk, an endometrial tissue sample at menopause should be taken. For colon and rectum cancer, a digital rectal exam every year after 40, and a stool blood test every year after 50 as well as a procto exam every 3-5 years after two initial negative tests one year apart.

Some people are at higher risk for certain cancers and may need tests more frequently. (See pp. 9-14 for high risk factors.)

COLORECTAL CANCER: EARLY DETECTION IS THE KEY

When cancer of the colon and rectum is found and treated in an early, localized stage, the 5-year survival rate is 90% for colon cancer and 80% for rectal cancer. However, survival figures drop to 40% and 31%, respectively, after the cancer has started to spread to other parts of the body.

Because colorectal cancer develops over a period of time, detection of the disease is possible long before symptoms appear. Early detection of small cancers and polyps reduces the likelihood of major surgery and the need for a colostomy—an abdominal opening created for the elimination of wastes. In fact, permanent colostomies are rare in cases of colon cancer, and are necessary in only 15% of rectal cancer cases.

Colorectal cancer is second only to lung cancer in terms of incidence. Currently, about 151,000 new cases develop each year; about 61,000 people die from the disease annually. The incidence of colorectal cancer tends to increase with age, starting at 40 years. More than 94% of all cases occur after the age of 50. Colorectal cancer occurs about equally in both sexes. Anyone with a personal or family history of colorectal cancer, polyps in the colon or inflammatory bowel disease, is at particularly high risk for the disease and should be examined carefully.

Evidence suggests that bowel cancer may be linked to a diet high in fat and/or low in fiber content.

Projected 5-year survival rates for colorectal cancer show that early detection saves lives. Currently, the 5-year survival rate is estimated at 55%. With the use of early detection techniques, such as the digital rectal exam, the stool blood test and sigmoidoscopy, and with appropriate management, the survival rate for patients with colorectal cancer could be increased from 55% to 85%. This means that, over a period of time, 125,000 lives, versus the current 80,000, could be saved each year.

It is recommended that the following procedures, all part of a cancer-related checkup, be performed at designated intervals:

- A digital rectal examination every year after age 40.
- A stool blood test every year after age 50.
- A procto every three to five years after the age of 50, following two annual negative examinations.

These guidelines apply *only* to people without symptoms. Persons with rectal bleeding, cramping abdominal pain, or a change in bowel habits should see their physicians immediately.

A 1987 study of men and women age 40 and over, conducted for the Society by the Gallup Organization, revealed a number of important findings concerning Americans' attitudes toward detection measures for colorectal cancer. There has been some increase in public awareness of the 3 tests recommended to detect the disease, but there is much room for improvement. The study found, for instance, that the percentage of Americans who ever had a digital rectal examination increased slightly since 1983, from 51% to 56%. Likewise, the percentage of Americans who ever had a stool blood test rose, from 28% in 1983 to 40% in 1987. And while the percentage of men and women 50 and over who ever had a proctoscopic examination rose from 31% in 1983 to 42% in 1987, 60% of Americans who should have the examination (according to the ACS guidelines) have not had it.

The survey also showed that 24% of those individuals in the 40-plus age group have ever asked their doctor to examine their colon or rectum. And of this group, more than half did so only because something was bothering them.

On the promising side, the survey showed that almost 50% of all Americans would be interested in learning more about this form of cancer.

PREVENTION

BREAST CANCER: A PROGRAM OF ACTION

About one out of every 10 women in the United States will develop breast cancer during her lifetime. And until the disease can be prevented, the best way women can protect themselves is through early detection and prompt treatment. Today, with modern technologies, breast cancer can be detected at very early stages of development, when the chance of cure is highest.

The risk of breast cancer increases as a woman grows older, and genetic and lifestyle variances—a history of breast cancer in a close family relative, giving first birth after age 30, never giving birth, and obesity (body weight 40% above normal)—may increase risk further.

The American Cancer Society recommends that women develop a three-part, personal plan of action, in cooperation with their doctors for early detection of breast cancer. (See page 19 for Checkup Guidelines.)

A **clinical breast exam** should be performed by a doctor as part of a regular health checkup. This includes a visual inspection of the breasts, looking for changes in shape or size or skin dimpling, followed by a thorough inspection of the breast, chest and armpits. Women should ask their doctors how often they should have a clinical breast exam.

A **mammogram** is a low-dose breast X ray that can identify cancers too small to be felt. Follow the ACS guidelines for recommended frequency, depending on age and health history. Recent improvements have reduced the amount of radiation necessary for high-quality mammograms.

The Society recommends that all women over the age of 20 perform **breast self-examination** once a month. BSE is important because breast cancer symptoms may develop and be found between clinical breast exams or mammography. Through regular self-examination women become familiar with their breasts, making any changes more likely to be noticed.

TOBACCO USE

The American Cancer Society estimates that cigarette smoking is responsible for 85% of lung cancer cases among men and 75% among women—about 83% overall.

The cancer death rate for male cigarette smokers is more than double that of nonsmokers, and the rate for female smokers is 67% higher than for nonsmokers. The American Cancer Society estimates that 40% of male smokers and 28% of female smokers die prematurely, or about 35% overall.

The higher cancer rates for men reflect the fact that in the past, more men than women smoked, and smoked more heavily. In recent years, however, the gap between male and female smoking has been narrowing.

Smoking also has been implicated in cancers of the mouth, pharynx, larynx, esophagus, pancreas, cervix uteri and bladder. Smoking accounts for about 30% of all cancer deaths, is a major cause of heart disease, and is linked to conditions ranging from colds and gastric ulcers to chronic bronchitis and emphysema.

Smoking is related to 390,000 deaths each year. A September 1985 study by the U.S. Congress Office of Technology Assessment estimates the cost of smoking to the economy from $38 billion to $95 billion, with a middle estimate of $65 billion. This amounts to $2.17 in lost productivity and the treatment of smoking-related diseases for each pack of cigarettes sold.

A Decline in Smoking

A September 1987 tobacco report of the U.S. Department of Agriculture estimates cigarette output in 1987 at 654 billion, down 1.0% from 1986, about the same decrease as the previous year.

From 1976 to 1987, adult male smokers (20 years and older) dropped from 42% of the population to 33%, while women smokers decreased from 32% to 28%, according to the National Center for Health Statistics. Overall, the percentage of adult smokers in the population had dropped to 30%. A 1987 report from the Office of Smoking and Health says that 26.5% of Americans now smoke.

Per capita cigarette consumption among adults has fallen—from 4,141 in 1974 to 3,121 in 1988—reflecting a growing number of ex-smokers. This is the lowest per capita consumption since 1944. From 1965 to 1987, the proportion of adult male ex-smokers (20 years and older) in the total U.S. population increased from 20% to 31%, while female ex-smokers rose from 8% to 19%.

A survey supported by the National Institute on Drug Abuse indicated that the percentage of high school seniors (aged 17 and 18) who smoked cigarettes daily decreased from 29% in 1976 to 19% in 1987.

It is now estimated—from past national surveys and data from the Cancer Prevention Study II—that there are about 40 million ex-cigarette smokers in the U.S. today and about 50 million smokers.

At the same time, however, the average smoker appears to be smoking more heavily. The U.S. Office on Smoking and Health reports that the proportion of adult male smokers (20 years and older) consuming 25 or more cigarettes per day increased from 30.7% to 32% between 1976 and 1985, and female smokers from 19.0% to 21%.

Figures from the U.S. Department of Agriculture show that a total of 567 billion cigarettes were consumed in 1988, down from 575 billion in 1987.

Nicotine Addiction

The Surgeon General released a report on nicotine addiction in May 1988. The report points out that all tobacco products contain substantial amounts of nicotine. Nicotine is absorbed readily from tobacco smoke in the lungs and from smokeless tobacco in the mouth or nose, and is rapidly distributed throughout

PREVENTION

the body. The conclusions were:
1) Cigarettes and other forms of tobacco are addicting; 2) Nicotine is the drug in tobacco that causes addiction; and 3) The pharmacologic and behavioral processes that determine tobacco addiction are similar to those that determine addiction to drugs such as heroin and cocaine.

Lower Tar & Nicotine

Research has shown that there is no such thing as a "safe" cigarette, but that those who are not yet able to quit would be well advised to switch to brands with the lowest possible tar and nicotine (T/N) content. Moreover, low T/N smokers find it easier to quit altogether than high T/N smokers.

In an ACS study conducted from 1960 to 1972, the average mortality of low T/N smokers was 16% lower than that of high T/N smokers, and the comparable figure for lung cancer mortality was 26%.

It is important to remember that besides tar and nicotine, cigarette smoke contains a host of other poisonous gases such as hydrogen cyanide, volatile aromatic hydrocarbons, and especially carbon monoxide—possibly a critical factor in coronary heart disease and fetal growth retardation. While some hazards are reduced slightly by cigarette filters, certain filtered brands have been found to actually deliver more carbon monoxide than those without filters.

Involuntary Smoking Hazards

There are hazards for nonsmokers who breathe the smoke of others' cigarettes. Several scientific studies, including a recent study by the American Cancer Society, have found an increased risk of lung cancer among nonsmoking wives of cigarette smokers. Although some studies have not shown an effect, evidence continues to grow indicating that involuntary smoking is a hazard.

Two major reviews in 1986 by the Surgeon General and the National Academy of Sciences state that involuntary smoking is a health hazard. Another NAS report, also in 1986, states that the amount of smoke inhaled on airplane trips constitutes a hazard, particularly to airline personnel, and recommended that cigarette smoking on airlines be banned.

The Society's Cancer Prevention Study II, involving more than one million Americans, will include a careful assessment of cancer risk and other diseases among smokers and involuntary smokers.

Smokeless Tobacco

There has been a recent resurgence in the use of all forms of smokeless tobacco—plug, leaf and snuff—but the greatest cause for concern centers on the increased use of "dipping snuff." In this practice, tobacco that has been processed into a coarse, moist powder is placed between the cheek and gum, and nicotine, along with a number of other carcinogens, are absorbed through the oral tissue. "Dipping snuff" is a highly addictive habit, one that exposes the body to levels of nicotine similar to those of cigarettes. A 1986 report of the Advisory Committee to the Surgeon General, outlining the health consequences of smokeless tobacco use, concluded that there is strong scientific evidence that the use of snuff causes cancer in humans, particularly cancer of the oral cavity. Oral cancer occurs several times more frequently among snuff dippers compared to non-tobacco users, and the excess risk of cancer of the cheek and gum may reach nearly 50-fold among long-term snuff users. Smokeless tobacco is becoming a problem large in scope; the report found that in 1985 smokeless tobacco was used by at least 12 million people in the United States, and half of these were regular users. The use of smokeless tobaccos is increasing among male adolescents and young male adults.

Industrial Hazards

Industrial workers are especially susceptible to lung diseases due to the combined effects of cigarette smoking and exposure to toxic industrial substances such as fumes from rubber, chlorine and dust from cotton and coal. Exposure to asbestos in combination with cigarette smoking increases an individual's lung cancer risk nearly 60 times.

NUTRITION AND CANCER: A COMMON SENSE APPROACH

Extensive research is under way to evaluate and clarify the role diet and nutrition play in the development of cancer. At this point, no direct cause-and-effect relationship has been proved, though statistics show that some foods may increase or decrease the risks for certain types of cancer. Evidence indicates that people might reduce their cancer risk by observing the following recommendations:

1. Avoid obesity.

Individuals 40% or more overweight increase their risk of colon, breast, prostate, gallbladder, ovary, and uterine cancers. People with weight problems should consult their physicians to determine their best body weight, since their medical condition and body build must be taken into account. Physicians can recommend a suitable diet and exercise regimen to help maintain an appropriate weight.

2. Cut down on total fat intake.

A diet high in fat may be a factor in the development of certain cancers, particularly breast, colon and prostate. In addition, by avoiding fatty foods, people are better able to control body weight.

PREVENTION/THE AMERICAN CANCER SOCIETY

3. Eat more high-fiber foods such as whole grain cereals, fruits and vegetables.

Regular consumption of cereals, fresh fruits and vegetables is recommended. Studies suggest that diets high in fiber may help to reduce the risk of colon cancer. Furthermore, foods high in fiber content are a wholesome substitute for foods high in fat.

4. Include foods rich in vitamins A and C in your daily diet.

People should include in their diet dark green and deep yellow fresh vegetables and fruits, such as carrots, spinach, sweet potatoes, peaches, and apricots as sources of vitamin A; and oranges, grapefruit, strawberries, green and red peppers for vitamin C. These foods may help lower risk for cancers of the larynx, esophagus and the lung. The excess use of vitamin A supplements is not recommended because of possible toxicity.

5. Include cruciferous vegetables in your diet.

Certain vegetables in the cruciferous family—cabbage, broccoli, brussels sprouts, kohlrabi and cauliflower—may help prevent certain cancers from developing. Research is in progress to determine how these foods may protect against cancer. Cruciferous vegetables have flowers with four leaves in the pattern of a cross.

6. Eat moderately of salt-cured, smoked and nitrite-cured foods.

In areas of the world where salt-cured and smoked foods are eaten frequently, there is more incidence of cancer of the esophagus and stomach. The American food industry has developed new processes to avoid possible cancer-causing by-products.

7. Keep alcohol consumption moderate, if you do drink.

The heavy use of alcohol, especially when accompanied by cigarette smoking or smokeless tobacco, increases risk of cancers of the mouth, larynx, throat, esophagus and liver.

THE AMERICAN CANCER SOCIETY

PROFILE

The ACS traces its origins to 1913, when a group of ten physicians and five laymen met in New York City and founded the American Society for the Control of Cancer. Its stated purpose at the time was to "disseminate knowledge concerning the symptoms, treatment, and prevention of cancer; to investigate conditions under which cancer is found; and to compile statistics in regard thereto." Later renamed the American Cancer Society, it is today one of the oldest and largest voluntary health agencies in the United States, comprised of 2.5 million Americans united to conquer cancer through balanced programs of research, education, patient service and rehabilitation.

Organization: The American Cancer Society, Inc. is composed of a National Society, with 57 chartered Divisions and 3,232 Units.

The National Society: A 206-member House of Delegates provides a basic representation from the 57 Divisions and additional representation on the basis of population. It elects and is governed by a Board of Directors of 124 voting members, approximately half of whom are members of the medical or scientific professions.

The National Society is responsible for overall planning and coordination, provides technical help and materials to Divisions and Units, administers programs of research, medical grants and clinical fellowships, and carries out public and professional education on the national level.

The 57 Divisions: These are governed by members of Divisional Boards of Directors, both medical and lay, in all the states plus five metropolitan areas, the District of Columbia and Puerto Rico.

The Units: These are organized to cover the counties in the United States. There are thousands of community leaders who direct the Society's programs at this level.

The Programs: The Society maintains its priorities and goals through activities developed by the departments of Research, Professional Education, Public Education, Public Information, Epidemiology and Statistics, Service and Rehabilitation, Public Affairs, and Crusade.

PUBLIC EDUCATION

The American Cancer Society has a strong and long-standing commitment to educating the public about ways of preventing or reducing the risk of developing cancer. Because each year thousands of lives could be saved through cancer prevention, risk reduction and early detection practices, the Society's Public Education programs are designed to inform people about cancer, tell them what they can do to protect

THE AMERICAN CANCER SOCIETY

themselves, and demonstrate related health habits and lifestyles.

The Society places its major educational focus in two areas: 1) primary cancer prevention which includes smoking control and the relationship between diet, nutrition and cancer; and 2) the importance and value of periodic, cancer-related checkups and specific cancer early detection tests. Prompt action in the event that one of cancer's seven warning signals occurs, is also encouraged.

Six cancer sites offer the greatest opportunity for the prevention or cure of cancer: colon and rectum, lung, breast, uterus, oral cavity and skin. These sites account for the majority of cancer cases and about half of all cancer deaths. The Society's Public Education planning strategy places emphasis on these six sites where prevention, risk reduction and early detection practices realize the greatest return in terms of lives saved.

Educating the Young and Old

ACS Public Education programs are divided into two major audience categories: adults and youth. Adults are reached through their worksite, healthsite and community. Programs for adults are carried out in small group settings or on a one-to-one basis, involving two-way communication and interaction. Whenever possible, volunteers are selected on the basis of skills that can be readily adapted to Society work, such as ex-smokers with group experience who can help in smoking cessation programs, and nurses who can teach breast self-examination to groups of women. The Society reinforces its Public Education messages with a variety of audio-visuals, pamphlets and posters.

Youth programs are organized according to age-level to reach children and youth on the pre-school, elementary, intermediate and secondary levels. The program for youth is a scientific, comprehensive cancer education program with promise of significant impact on cancer risk. Educational strategies are designed to teach young people good health habits, help them to make health-enhancing lifestyle decisions and understand health behavior as it relates to cancer risk reduction. Materials are available as coordinated components or program packages and are implemented through existing school curricula or as a basic introduction to health. Youth programs are usually conducted in the nation's schools and often include activities to be used in the home and community.

Reaching More People

In 1987-88, American Cancer Society Public Education programs, carried out at local levels, reached 23 million adults and 27 million young people for a total of 50 million.

In the decade of the 1980's, the Society, as its goals, hopes to encourage more Americans to have tests for colorectal cancer, reduce the number of smokers, and increase the number of women who have breast cancer detection tests and who practice monthly breast self-examination, get Pap tests and have endometrial tissue samples taken. To help achieve its education objectives and priorities, the Society has launched a number of programs including "Taking Control" and "Eating Smart" for a healthier life of reduced cancer risk; "Special Delivery, Smoke Free" for pregnant women who are smokers; "Starting Free, Good Air For Me" for preschool children; "Where There's No Smoke..." on involuntary tobacco smoke; and an educational emphasis on breast cancer detection awareness, "Special Touch."

In addition to the Society's intensive, person-to-person educational outreach, broader ACS programs blanket the nation with lifesaving messages. During the Society's annual door-to-door fund-raising Crusade, volunteers make personal home visits, informing individuals on how to protect themselves against cancer.

PROFESSIONAL EDUCATION

ACS Professional Education programs bring the latest developments in cancer control and management to health professionals, especially primary care providers.

Professional Education's National conferences, clinical awards, materials, professorships and scholarships provide information and training in the prevention and early detection of cancer, and in the treatment and rehabilitation of cancer patients. Breast Cancer Detection Awareness, Colorectal Health Check and Tobacco-Free Young America are among the major initiatives offered by Divisions and Units as interdepartmental collaboration promoted by Professional Education. Recruitment and involvement of health professionals into Professional Education remains a major objective, particularly primary care providers.

Audiovisuals, Journals, and Other Publications

Videotapes, films, slide sets, audiotapes, publications and exhibits are available for physicians and other health professionals as well as for programs in hospitals, medical, dental and nursing schools. The Society publishes several texts and pamphlets dealing with various cancer issues along with proceedings of its conferences and workshops. Audiovisuals and other publications are distributed through ACS Divisions and Units.

Ca-A Cancer Journal for Clinicians, (470,000 circulated) is directed to update health professionals about cancer. The Society supports the publication of *Cancer*, directed to those specializing in cancer research and in the care of the cancer patient.

THE AMERICAN CANCER SOCIETY

Nursing Programs

Cancer Nursing News is sent to about 90,000 nurses. It keeps nurses up-to-date on cancer, oncology nursing, the American Cancer Society, and opportunities in continuing education. The newsletter is sent free to any nurse; requests for subscriptions should be sent to the Executive Editor, *Cancer Nursing News*, c/o American Cancer Society, 1599 Clifton Road, N.E., Atlanta, GA 30329.

Twenty one-year nursing scholarships are awarded each year to qualified graduate students studying for a master's degree with a specialty in cancer nursing. The recipients may apply for a second year's funding. A training program to prepare nurses for Ph.D.'s in related fields was initiated with the funding of the first three candidates in 1986.

Professorships in Clinical Oncology

Leading experts in oncology are supported to promote cancer education in medical and health professional schools. Since the award's inception in 1970, the Society has funded 53 professors. Recently the program has expanded to fund its first Professor involved in Dental Oncology.

Clinical Oncology Awards

The ACS National Clinical Awards Program was established in 1948 to provide broad support for oncology training at qualified hospitals and institutions. Over the past 40 years, Regular Clinical Fellowships and Junior Faculty Clinical Fellowships have had considerable impact on the training of physicians and dentists in oncology specialties, training over 8,500 individuals to provide care to cancer patients nationwide.

The program has changed somewhat over time; the original awards have been modified based on changes in oncology over time. Currently, monies are provided via the Clinical Oncology Fellowships (COF) and Clinical Oncology Career Development Award (CDA). The former program replaces the regular Clinical Fellowship and intends to provide unique training opportunities for fellows to expand their expertise in oncology. The CDA is awarded to outstanding individuals who have demonstrated a commitment to pursue an academic career in oncology.

For the first time, a traineeship is being offered for Oncology Social Workers committed to clinical practice and research to benefit cancer patients and their families. The first awards will be made in 1989 to 24 master's and post-master's candidates.

To meet the needs in cancer prevention and detection, the concept of a new career development award for primary care physicians is under consideration. When accepted, these awards will help develop academic leaders in primary care to promote lifesaving techniques to the critical specialties.

The implementation of training program support for allied health professionals is also being studied. By broadening and expanding our efforts in oncology training, the Society's long-term goal of promoting cancer education, cancer control and cancer management among all health care providers will be advanced.

Unproven Methods of Cancer Management

The American Cancer Society maintains information on unproven methods of cancer management. This information is reviewed in-depth and is issued in position statements. These statements are available on request to physicians, science writers, editors and the general public, to assist in evaluating claims made for unproven methods of diagnosis and treatment.

The Committee on Unproven Methods of Cancer Management has commissioned a survey to determine the prevalence of, reasons for use, and patterns of use of unproven methods by the cancer patient. The findings from this study will provide guidelines for future programs in unproven methods of cancer management.

SERVICE AND REHABILITATION

In 1988, over one-half million cancer patients were reached through the innovative service and rehabilitation programs of the American Cancer Society. Because of the many volunteers at the Division and Unit levels, the Society is able to offer a wide range of services.

Service Programs

Resources Information and Guidance Services. Specific information is provided about cancer, as well as referral to Society services and other resources in the community to meet the social, psychological and home care needs of cancer patients and their families.

Home Care Items. This program provides necessary useful home care supplies, equipment, dressings and gifts for the comfort and recreation of the patient.

Transportation. Through the efforts of volunteer drivers in programs such as Road to Recovery, transportation is provided to patients, enabling them to maintain their medical and continuing care programs.

Rehabilitation Programs

CanSurmount. This is a short-term visitor program for patients, and the families of patients, with many types of cancer. Hospital and home visits are made with the approval of the physician. The one-to-one visit by a person who has experienced the same type of cancer offers functional, emotional and social support.

THE AMERICAN CANCER SOCIETY

Reach to Recovery. This program, the largest of the Society's patient visitor programs, addresses the many needs of women who have or have had breast cancer. Carefully selected and trained volunteer visitors provide support and information, with the approval of the attending physician. The program is designed to help women meet the physical, emotional, and cosmetic needs related to their disease and/or its treatment. In addition, literature and services to help husbands, children and friends of breast cancer patients are available.

Laryngectomy Rehabilitation. Spearheaded by the International Association of Laryngectomees (IAL), this program brings the message that a laryngectomee can return to a normal life. Coordinated through more than 325 clubs, laryngectomee visitors provide pre- and/or postoperative support to patients who have recently undergone removal of the larynx.

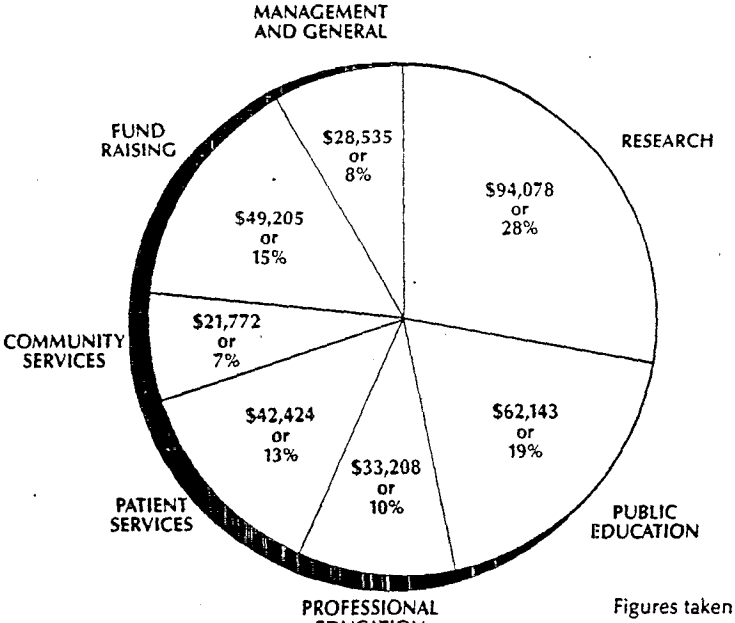
Ostomy Rehabilitation. Some patients with intestinal or urinary cancers must have abdominal ostomies (surgically constructed openings for elimination of body wastes). Trained volunteers who have experienced this same type of surgery offer help on a one-to-one basis. Cooperating with the United Ostomy Association and enterostomal therapists, patients are assisted in their physical and psychological adjustment.

Patient and Family Education Programs

The Society sponsors group and individual education programs, distributes pamphlets and booklets and provides audiovisual presentations for patients of all ages and their families to help them understand and deal with the complexities of the disease.

I Can Cope. Information is provided on cancer therapy, treatment, side effects, nutrition, resource availability and other topics of interest to cancer patients and their families.

ALLOCATION OF ACS FUNDS BASED ON TOTAL 1987-1988 BUDGET—$331,365



Figures taken from 1987 Annual Report
(000's omitted)

COSTS OF CANCER

A study by the National Center for Health Statistics (NCHS) puts overall medical costs for cancer at $71.5 billion for 1985; $21.8 billion for direct costs; $8.6 billion for so-called morbidity costs (cost of lost productivity), and $41.2 billion for mortality costs. The figures show that cancer accounts for 10% of the total cost of disease in the U.S. and that its share of the total cost of premature death is about 18% of all causes of death.

Individuals have several sources of help in paying for cancer costs: third-party payers such as Blue Cross and private insurance companies, public agencies and private health organizations. Cancer is covered by personal insurance plans either under narrowly defined cancer policies or through catastrophic illness provisions in comprehensive insurance programs.

The Third National Cancer Survey showed that for patients under 65 years, Blue Cross and private insurers were the source of payment in over 77% of the cases. For patients over 65, Medicare paid expenses in nearly 88% of the cases.

RESEARCH

THE ACS AND RESEARCH

The American Cancer Society is the largest source of private cancer research funds in the United States, second only to the National Cancer Institute, an agency of the Federal government.

The Society's overall investment in research each year has grown steadily from $1 million in 1946 to over $86 million* today. This sum represents nearly a third of the total ACS budget. To date, the Society has invested close to $1 billion in cancer research.

The research program focuses primarily on investigator-initiated projects, rather than directed research undertaken on a contract basis. With the exception of staff and facilities to carry out its epidemiological studies, the ACS neither hires staff researchers nor operates its own laboratories. This gives the Society the freedom to place its grants where the most innovative and promising ideas are being explored.

A key factor in the role of the Society in cancer research is providing qualified scientists with alternative funding sources to carry out their work. The Society believes it can make the most effective use of its research funds by supporting investigators working in established medical and other scientific institutions across the country. In this way there is a minimum of overhead and a maximum of flexibility to make sure that research money has the highest probability of yielding results that will benefit people.

Applications for ACS grants are put through a rigorous process of evaluation, beginning with careful study by the appropriate one of 12 scientific review committees and then by two additional groups of experts. They must be given final approval by the National Board of Directors.

Kinds of Grants

The Society's research program is diverse in concept and recipients. It provides support both for established scientists and those starting out on their own independent research. It funds postdoctoral training for promising young investigators and stimulates new ideas in cancer research among those working in universities, institutes and teaching hospitals.

Overall, the program offers five types of grants: (1) Research and Clinical Investigation Grants to finance investigator-initiated research; (2) Institutional Research Grants to universities, institutes and hospitals to support pilot studies and the work of young investigators in cancer; (3) Research Personnel Grants to outstanding scientists and fellows specializing or planning to specialize in cancer research; (4) Research Development Program Grants to provide rapid funding for priority projects; and (5) Special Institutional Grants for Cancer Cause and Prevention Research to provide longer term funding for interdisciplinary projects for which support is not readily available through the Society's other programs.

Research Professorships. The Research Professorship program, unique in the field, has been in existence since 1957. The Society supports 25 of the nation's most gifted scientists for long periods of time, until their retirement. These are people devoting their lives' work to cancer research. Freed of major administrative responsibilities and other restrictions, they can concentrate on their fields of scientific investigation.

Clinical Research Professorships. This novel and unique program is a new initiative of the Society to provide support for clinicians and scientists who are able to facilitate advances in clinical cancer research by bridging the gap between basic science and clinical medicine. Three awards have been made since the inception of the program in 1987.

Physicians' Research Training Fellowships. Unique in the research world, this type of Research Personnel Grant was inaugurated in 1981 because of a dearth of MD's in the research field. It provides an opportunity for physicians to take three years from their medical careers to train as researchers.

Research Development Program. Established to identify and provide rapid funding for high priority projects, approved applications can be funded in *less than three months*. This compares with the 10 to 18 months required by the Federal government before a new application can be funded.

The kinds of research projects eligible under the Research Development Program include: (1) unique research opportunities which cannot wait for the normal lengthy funding procedures; (2) unanticipated needs relating to research already under way; (3) program coordination, especially that involving clinical trials and the dissemination of research results to community hospitals; and (4) program integration between the American Cancer Society and other health organizations.

All applications are evaluated for merit, qualifications and productivity of the investigator, relevance, need for rapid funding, and probability of the project's eventual contribution to cancer control. More than $13 million has been appropriated so far to the Research Development Program, over half of which has been for interferon research.

Interferon Research. Interferons, a group of natural body proteins, were discovered as antiviral agents, and later found to have some anticancer activity. In 1978, the Society invested an unprecedented $2 million to purchase interferon for clinical trials. At the time, interferons were extremely scarce and expensive, since they were obtained from human blood cells.

Interferons work dramatically to improve certain diseases such as hairy cell leukemia and some lymphomas and papillomas. In these the frequency of improvement approaches 90%. In other diseases, such as kidney cancer and Kaposi's sarcoma, there are dramatic responses, but they are far less frequent — on the order of 10-30%; in lung and colon cancer, interferon rarely causes improvement. The thrust of current research with interferons is to attempt to improve their effectiveness by combining them with

*Subject to audit

RESEARCH

more conventional chemotherapeutic drugs and by using mixtures of different interferons.

Large quantities of certain types of interferon can be produced now using the techniques of recombinant DNA. They are far cheaper and purer than the original human blood substances, and have recently been approved for marketing. The new technology is also extremely valuable for producing complex drugs and chemicals to benefit mankind. Furthermore, other substances, called biologic response modifiers, which use immune means to combat cancer are being developed at a rapid pace, including interleukin-2/lymphokine-activated killer cell (IL-2/LAK) reagents which appear to shrink such cancers as kidney and melanoma. Some of these reagents are very potent and quite toxic, and the search is on to find effective and safer ways to use them in patients.

Research in the 80's

In addition to ongoing interferon studies, ACS-funded researchers continue to investigate broad areas of cancer research in this decade. For example, they are exploring:

Genetic engineering. One method in this new technology, recombinant DNA, is already being used to produce interferon. It has among its potential uses the manufacture of powerful new drugs, correcting impaired immune systems, even modifying heredity by transplanting foreign genes. It is hoped that the process will yield other anticancer activities. Some that appear quite promising at the moment are tumor necrosis factor (TNF), interleukin-2, and certain bone marrow growth regulators.

Monoclonal antibodies. Tailor-made, highly specific monoclonal antibodies can be produced that will preferentially recognize cancer cells, and thus be able to detect cancer early, when the disease is most curable, before clinical signs appear. Monoclonal antibodies already have been used to deliver drugs directly to tumors, killing them but sparing healthy tissue.

Mechanisms of carcinogenesis. Investigators are approaching these key questions from many angles. One model, as found in animals, shows that cancer in humans develops in a two-step process — initiation and promotion. Other questions include: Are there proto-oncogenes, normal genes serving as master switches for early tissue development, which induce normal cells to become cancerous later in life? If so, what turns them on? Can they be programmed to stay off? Do viruses, already known to cause cancer in animals, also cause cancer in humans, perhaps by activation of these proto-oncogenes? Conversely, a normal gene that appears to suppress cancer development has been isolated recently. Does this gene produce a substance that stops normal cells from dividing before they become cancerous? Many of these questions are now being answered.

Chemoprevention. There is strong evidence that perhaps people can be protected from cancer by what they eat or drink, or by other substances or lifestyles that serve as defense mechanisms. Clues are being pursued by ACS researchers studying such agents as vitamin A; retinoids (synthetic forms of vitamin A); vitamin C; vitamin E; the chemical element selenium, found in the soil; and other naturally occurring substances in brussels sprouts, cabbage, and certain other foodstuffs. This is a new and important area which needs further research so that recommendations can be developed on how people should change their lifestyles to reduce their chances of getting cancer.

Still other ACS investigators are looking for ways to detect cancer earlier by tracing a cell's biochemical markers. They are exploring evidence that the outbreak of the rare cancer, Kaposi's sarcoma, frequently found in patients with AIDS, is linked to a breakdown in the individual's immune system. And they are testing the hypothesis that certain chemicals enhance a tumor's responsiveness to radiation therapy.

The Financial Research Picture

In fiscal 1988, the ACS made 818 grants to major institutions in this country and to scientists working here and abroad. The total amount, subject to audit, was over $83 million. This does not include some $3 million granted directly by ACS Divisions. The following table—covering the years 1985-1988 inclusive—lists the number of applications received, the total number of dollars required, and those actually funded by the ACS National Office.*

	Requested		Funded	
Year	Number	Amount	Number	Amount
1985	2,096	$273,968,261	712	$63,703,751
1986	2,438	364,065,882	775	73,896,704
1987	2,385	368,645,879	810	77,516,363
1988	2,281	357,408,459	818	83,936,347

CANCER AND THE ENVIRONMENT

Most cancer cases in the United States are believed to be environmentally related, that is, associated in some way with our physical surroundings, personal habits or lifestyles.

Occupational hazards, although associated with only a small percentage of cancers, are under close surveillance. Virtually every suspected major chemical and other substance in the workplace presumed to be a health risk is under investigation. Each study can require years and hundreds of thousands of dollars to complete.

Some environmental causes of cancer are well known. About 30% of all cancers are directly related to the use of tobacco, either alone or in conjunction with excessive consumption of alcohol.

Other causes are harder to determine. Diet is suspected as an important element in cancer risk, some say as much as 35% of all cancer deaths. There is much research underway on the role diet and nutrition play in the development of cancer.

To help identify environmental factors in human cancer, the American Cancer Society has undertaken

*Subject to audit

RESEARCH

a two-part program of environmental cancer research. This involves (1) Cancer Prevention Study II, an epidemiologic study to examine the relationship of environment and lifestyle to cancer development; and (2) support of extramural cancer cause and prevention research projects.

The American Cancer Society's Cancer Prevention Study II

One of the largest research studies ever carried out in the United States was launched in 1982. Cancer Prevention Study II, a long-term prospective study, is examining the habits and exposures of more than one million Americans to learn how lifestyles and environmental factors affect the development of cancer.

Modeled after the first ACS Cancer Prevention Study (1959-72), CPS-II is similar in method but wider in scope and involves more participants.

Over 77,000 volunteers enrolled 1.2 million men and women in the study. These volunteer researchers distributed a four-page confidential questionnaire to participants who were asked about their exposures to certain environmental conditions, their history of disease and their lifestyles. The questionnaires were designed to elicit more than 500 pieces of information each, which were computerized for statistical analysis.

Many of the questions focus on health issues of current concern. These include risks of certain drugs, foods and various occupational exposures; low-tar and nicotine cigarettes; consumer products; long-term exposure to low-level radiation; and the health effects associated with air and water pollution.

For a period of six years, the volunteers will keep track of the status and whereabouts of study participants. Various suspected relationships will be tested by comparing mortality rates of differently exposed groups.

The goal of the study is to identify those factors that increase a person's chances of developing cancer, those that carry little or no risk, and those that actually may help prevent cancer.

So far, five papers have been published from the analyses of data on the original questionnaires. One showed massive changes in American smoking habits compared to 23 years earlier in CPS I. Among men, 24% smoked, half as many as in the earlier study. More than twice as many had quit cigarette smoking. Among women, the percent who had ever smoked rose 10%, but the percent of ex-smokers quadrupled. More than one-third of male smokers and one-half of female smokers smoked brands with less than 12 mg. of tar. Another paper from CPS II showed that smoking in physicians is now down to 16%, about 14% in dentists and 23% in nurses. A third paper showed that a greater percentage of women who used artificial sweeteners gained weight over a one-year period than nonusers. An additional five papers have been completed and submitted for publication. Another paper shows that death rates from all causes were 81% higher in obese and underweight people than those of average weight and that degree of exercise was negatively correlated with cancer death rates.

Since the first study, new factors in our environment have been identified that may be related to cancer. The Society decided to initiate a second study to respond to the concerns of the public and scientific community about suspected carcinogens.

Without the use of ACS volunteers, the cost of carrying out CPS II would total more than $100 million. With volunteers to collect the data, the study is estimated to cost only about $9 million to complete.

CANCER'S SEVEN WARNING SIGNALS

1. Change in bowel or bladder habits
2. A sore that does not heal
3. Unusual bleeding or discharge
4. Thickening or lump in breast or elsewhere
5. Indigestion or difficulty in swallowing
6. Obvious change in wart or mole
7. Nagging cough or hoarseness

If you have a warning signal, see your doctor.

30-YEAR TRENDS IN AGE-ADJUSTED CANCER DEATH RATES PER 100,000 POPULATION 1953-55 to 1983-85

SITES	SEX	1953-55	1983-85	PERCENT CHANGES	COMMENTS
ALL SITES	Male	175.7	203.1	+ 16	Steady increase mainly due to lung cancer.
	Female	145.1	138.2	- 5	Slight decrease.
BLADDER	Male	7.2	6.1	- 15	Slight decrease in recent years.
	Female	3.1	1.8	- 42	Some fluctuations; noticeable decrease.
BRAIN	Male	3.9	4.7	+ 21	Early increase in both sexes; later leveling off, reasons unknown.
	Female	2.6	3.2	+ 23	
BREAST	Male	0.3	0.2	*	Constant rate.
	Female	26.2	27.1	+ 3	Slight fluctuations; overall no change.
COLON & RECTUM	Male	25.8	24.7	*	Slight fluctuations; overall no change.
	Female	24.4	17.5	- 28	Slow, steady decrease.
COLON	Male	16.9	20.7	+ 22	Slow steady increase, leveling in recent years.
	Female	18.3	15.0	- 18	Slow, steady decrease.
RECTUM	Male	8.9	4.0	- 55	Slow steady decrease.
	Female	6.1	2.4	- 61	Slow steady decrease.
ESOPHAGUS	Male	4.7	5.6	+ 19	Some flucutations; small increase.
	Female	1.2	1.5	*	Slight fluctuations; overall no change.
KIDNEY	Male	3.6	4.9	+ 46	Steady slight increase.
	Female	2.2	2.3	*	Slight fluctuations; overall no change.
LARYNX	Male	2.6	2.7	*	Slight fluctuations; overall no change in both males and females.
	Female	0.2	0.5	*	
LEUKEMIA	Male	8.2	8.4	+ 2	Early increase, later leveling off and decrease.
	Female	5.5	5.0	- 9	Early slight increase; later leveling off and decrease.
LIVER**	Male	6.2	4.9	- 21	Decreasing rapidly early; later leveling off.
	Female	7.1	3.3	- 54	Some fluctuations; steady decrease.
LUNG	Male	28.0	73.1	+161	Steady increase in both sexes due to cigarette smoking.
	Female	5.1	25.3	+396	
LYMPHOMAS	Male	8.0	11.1	+39	Slow steady increase in both males and females.
	Female	5.1	7.5	+47	
ORAL	Male	6.0	5.2	*	Slight fluctuations; overall no change in both males and females.
	Female	1.5	1.8	*	
OVARY	Female	8.6	7.8	- 9	Steady increase; later leveling off and decrease.
PANCREAS	Male	9.1	10.2	+ 12	Steady increase in both sexes, then leveling off, reasons unknown.
	Female	5.7	7.2	+ 26	
PROSTATE	Male	21.3	23.2	+ 9	Fluctuations throughout; overall slight increase.
SKIN	Male	3.1	4.0	+ 29	Slight fluctuations; slight increase.
	Female	1.9	1.8	*	Slight fluctuations; overall no change.
STOMACH	Male	21.3	10.2	- 52	Steady decrease in both sexes; reasons unknown.
	Female	11.2	3.5	- 69	
UTERUS	Female	19.0	7.1	- 63	Steady decrease.

*Percent changes not listed because they are not meaningful.

**Primary and non-specified.

SUMMARY OF RESEARCH GRANTS & FELLOWSHIPS AWARDED BY ACS (National Society & Divisions) DURING THE FISCAL YEAR ENDED AUGUST 31, 1988 (Subject to Audit)

American Health Foundation, New York, NY	(1)	$1,000,000
Arizona State Univ., Tempe, AZ	(1)	82,000
Baylor College of Medicine, Houston, TX	(5)	462,000
Beth Israel Hosp., Boston, MA	(3)	208,500
Boston Univ., Boston, MA	(4)	358,500
Brandeis Univ., Waltham, MA	(5)	246,000
Brigham & Women's Hosp., Boston, MA	(1)	167,000
Brown Univ., Providence, RI	(5)	562,500
California Inst. of Tech., Pasadena	(10)	707,850
California State Coll., Fullerton	(1)	10,000
Carnegie Inst. of Washington, Baltimore, MD	(3)	119,500
Carnegie-Mellon Univ., Pittsburgh, PA	(1)	160,000
Catholic Med. Ctr. of Brooklyn & Queens, NY	(1)	96,000
Case Western Reserve Univ., Cleveland, OH	(3)	343,812
Children's Hospital of San Francisco, CA	(1)	200,000
City Coll. of City Univ. of New York	(1)	79,000
City of Hope Nat'l Med. Ctr., Duarte, CA	(1)	131,000
Cold Spring Harbor Lab., Cold Spring Hbr, NY	(6)	306,500
Columbia Univ., New York, NY	(15)	1,398,400
Cornell Univ., Ithaca, NY	(3)	354,000
Cornell Univ., New York, NY	(4)	357,600
Creighton Univ., Omaha, NE	(1)	94,000
Dana-Farber Cancer Ctr., Boston, MA	(14)	1,097,500
Dartmouth Coll., Hanover, NH	(3)	368,875
Drexel Inst. of Tech., Philadelphia, PA	(2)	320,000
Duke Univ., Durham, NC	(10)	998,855
Duquesne Univ., Pittsburgh, PA	(1)	70,000
East Carolina Univ., Greenville, NC	(2)	241,500
Emory Univ., Atlanta, GA	(3)	560,000
Eleanor Roosevelt Inst. for Ca. Res., Denver, CO	(2)	70,000
Foundation for Biomedical Res., Washington, DC	(1)	10,000
Fred Hutchinson Cancer Res. Ctr., Seattle, WA	(2)	283,000
Georgetown Univ., Washington, DC	(1)	101,000
Hahnemann Med. Coll., Philadelphia, PA	(2)	63,000
Harvard Medical School, Cambridge, MA	(19)	1,391,703
Harvard Sch. of Pub. Health, Boston, MA	(3)	300,000
Henry Ford Hospital, Detroit, MI	(1)	98,000
Inst. for Cancer Res., Philadelphia, PA	(3)	203,000
Illinois Cancer Council, Chicago, IL	(1)	100,000
Jackson Lab., Bar Harbor, ME	(3)	196,250
Jefferson Medical Coll., Philadelphia, PA	(1)	18,550
Jewish Hospital of St. Louis, MO	(1)	208,000
Johns Hopkins Univ., Baltimore, MD	(19)	2,011,000
Kaiser Foundation Res. Inst., CA	(1)	45,838
Kansas State Univ., Manhattan	(3)	215,285
Kirksville Coll. of Osteopathic Med., MO	(1)	84,000
La Jolla Cancer Res. Ctr., La Jolla, CA	(1)	84,000
Lehigh Univ., Bethlehem, PA	(2)	140,000
Louisiana State Univ., Baton Rouge	(4)	503,000
Loyola University, Chicago, IL	(1)	160,000
M.D. Anderson Cancer Ctr., Houston, TX	(1)	200,000
Marine Biology Lab., Woods Hole, MA	(1)	10,000
Massachusetts Eye, Ear Infirmary, Boston	(7)	87,406
Massachusetts General Hosp., Boston	(3)	329,500
Massachusetts Inst. of Technology, Cambridge	(16)	1,015,150
Medical Biology Institute, La Jolla, CA	(4)	536,000
Medical Coll. of Pennsylvania, Philadelphia	(1)	108,000
Medical Coll. of Virginia, Richmond	(3)	325,000
Medical Coll. of Wisconsin, Milwaukee	(4)	477,000
Medical Research Council, Cambridge, England	(1)	$ 70,000
Michigan Cancer Fdn., Detroit	(4)	680,500
Michigan State Univ., East Lansing	(3)	614,000
Miller's Children's Hospital, Long Beach, CA	(1)	250,000
Montefiore Hospital, Bronx, NY	(1)	61,000
Mount Sinai Sch. of Med., New York, NY	(4)	205,500
Nat'l Cancer Inst., Bethesda, MD	(1)	69,600
Nat'l Inst. of Allergy & Infectious Disease, Bethesda, MD	(1)	63,300
Nat'l Insts. of Health, Bethesda, MD	(1)	69,000
Nat'l Jewish Hosp. & Res. Ctr., Denver, CO	(5)	705,318
New England Med. Ctr. Hosp., Boston, MA	(1)	80,000
New York Acad. of Sciences, New York, NY	(1)	10,000
New York Medical Center, Valhalla	(1)	175,000
New York Univ., New York, NY	(9)	1,710,694
North Carolina State Univ., Raleigh	(1)	68,000
Northwestern Univ., Chicago, IL	(7)	603,920
Northern California Ca. Program, Oakland	(1)	193,000
Oak Ridge Nat'l Lab., Oak Ridge, TN	(1)	103,000
Ohio State Univ., Columbus	(4)	277,000
Oregon Health Sciences Lab., Portland	(2)	210,000
Oregon State Coll., Sci. Res. Inst., Corvallis	(3)	134,987
Oregon State Univ., Corvallis	(1)	32,000
Oxford University, England	(2)	140,100
Pacific Northwest Res. Fdn., Seattle, WA	(1)	110,000
Pennsylvania State Univ., Hershey	(7)	501,000
Portland State Univ., OR	(1)	174,000
Princeton Univ., Princeton, NJ	(15)	1,327,513
Pub. Health Res. Inst., New York, NY	(3)	497,000
Purdue Univ., Lafayette, IN	(3)	293,000
Reed Coll., Portland, OR	(1)	127,000
Rockefeller Univ., New York, NY	(7)	975,625
Roswell Park Mem. Inst., Buffalo, NY	(13)	1,519,449
Rutgers Univ., New Brunswick, NJ	(1)	160,000
St. Jude Children's Res. Hosp., Memphis, TN	(5)	646,000
St. Louis Univ., St. Louis, MO	(1)	40,000
Salk Inst. for Biological Studies, San Diego, CA	(2)	85,000
Scripps Clinic Res. Fdn., La Jolla, CA	(3)	393,000
Showa Univ. Res. Inst., St. Petersburg, FL	(1)	70,000
Sloan-Kettering Inst., New York, NY	(30)	3,426,000
Stanford Univ., Stanford, CA	(21)	1,619,400
State Univ. of Iowa, Iowa City	(3)	300,500
State Univ. of NY, Albany	(1)	25,797
State Univ. of NY, Buffalo	(1)	200,000
State Univ. of NY, Downstate	(1)	151,000
State Univ. of NY, Stony Brook	(9)	631,695
Syracuse Univ., Syracuse, NY	(3)	223,500
Temple Univ., Philadelphia, PA	(2)	218,000
Texas A&M, College Station	(1)	90,500
Tufts—New England Med. Ctr., Boston, MA	(1)	90,500
Tufts Univ., Medford, MA	(3)	285,500
Tulane Univ., New Orleans, LA	(2)	138,000
Univ. of Alabama Med. Ctr., Birmingham	(9)	953,008
Univ. of Arizona, Tucson	(2)	64,800
Univ. of Arkansas, Fayetteville	(1)	40,000
Univ. of Calif. (Various Locations)	(95)	9,544,063
Univ. of Chicago, Chicago, IL	(13)	1,182,787
Univ. of Cincinnati, Cincinnati, OH	(3)	300,000
Univ. of Colorado, Boulder	(14)	1,407,400
Univ. of Connecticut, Storrs	(4)	$ 679,000
Univ. of Delaware, Wilmington	(1)	63,600
Univ. of Florida, Gainesville	(3)	311,000
Univ. of Georgia, Athens	(1)	205,000
Univ. of Hawaii, Honolulu	(1)	10,000
Univ. of Illinois, Urbana	(5)	256,575
Univ. of Indiana, Bloomington	(4)	353,500
Univ. of Kansas, Lawrence	(3)	189,000
Univ. of Kentucky, Lexington	(1)	30,000
Univ. of Louisville, Louisville, KY	(1)	85,000
Univ. of Maryland, Baltimore	(5)	790,000
Univ. of Massachusetts, Amherst	(1)	110,000
Univ. of Med. & Dentistry of NJ, Newark, NJ	(5)	572,000
Univ. of Miami, Coral Gables, FL	(3)	447,000
Univ. of Michigan, Ann Arbor	(10)	1,167,720
Univ. of Minnesota, Minneapolis	(9)	1,023,000
Univ. of Nebraska, Omaha	(5)	1,264,826
Univ. of New Hampshire,	(1)	160,000
Univ. of New Mexico, Albuquerque	(3)	440,000
Univ. of North Carolina, Chapel Hill	(10)	1,137,925
Univ. of North Dakota, Grand Forks	(1)	102,000
Univ. of Oregon, Eugene	(4)	305,000
Univ. of Pennsylvania, Philadelphia	(8)	928,643
Univ. of Pittsburgh, Pittsburgh, PA	(8)	1,290,000
Univ. of Rochester, Rochester, NY	(8)	1,060,437
Univ. of Rhode Island, Kingston	(1)	43,200
Univ. of South Carolina, Columbia	(2)	83,000
Univ. of Southern California, Los Angeles	(5)	578,775
Univ. of South Florida, Tampa	(2)	308,000
Univ. of Tennessee, Memphis	(4)	408,000
Univ. of Texas (Various Locations)	(28)	3,044,200
Univ. of Toledo, Toledo, OH	(1)	63,000
Univ. of Utah, Salt Lake City	(4)	600,000
Univ. of Vermont, Burlington	(2)	288,000
Univ. of Virginia, Charlottesville	(9)	865,000
Univ. of Washington, Seattle	(10)	1,085,312
Univ. of Wisconsin, Madison	(11)	778,726
Univ. of Wyoming, Laramie	(1)	20,000
Univ. Louis Pasteur, Strasbourg, France	(1)	70,000
Vanderbilt Univ., Nashville, TN	(5)	455,225
Virginia Mason Hospital, Seattle, WA	(1)	105,500
Virginia Polytechnic Inst., Blacksburg	(1)	115,000
Wake Forest Coll., Bowman Gray Sch. of Med., Winston-Salem, NC	(5)	427,000
Washington State Univ., Pullman	(1)	35,000
Washington Univ., St. Louis, MO	(7)	731,000
Wayne State Univ., Detroit, MI	(3)	161,000
Whitehead Inst., Cambridge, MA	(10)	639,528
Wistar Inst., Philadelphia, PA	(9)	1,291,000
Worcester Fdn. for Exptl. Bio., Shrewsbury, MA	(1)	98,000
Woods Hole Ocean. Inst., Woods Hole, MA	(1)	180,000
Wright State Univ., Dayton, OH	(1)	149,000
Yale Univ., New Haven, CT	(19)	1,716,225
Yeshiva Univ.—Albert Einstein, The Bronx, NY	(17)	1,785,000
SUBTOTAL	(818)	83,936,347
Division Research Grants	(1)	3,000,000
TOTAL	(819)	86,936,347

Note: Numbers in parentheses indicate number of grants per institution for the year ended August 31 1988; totals subject to audit.